

THE IRON AGE

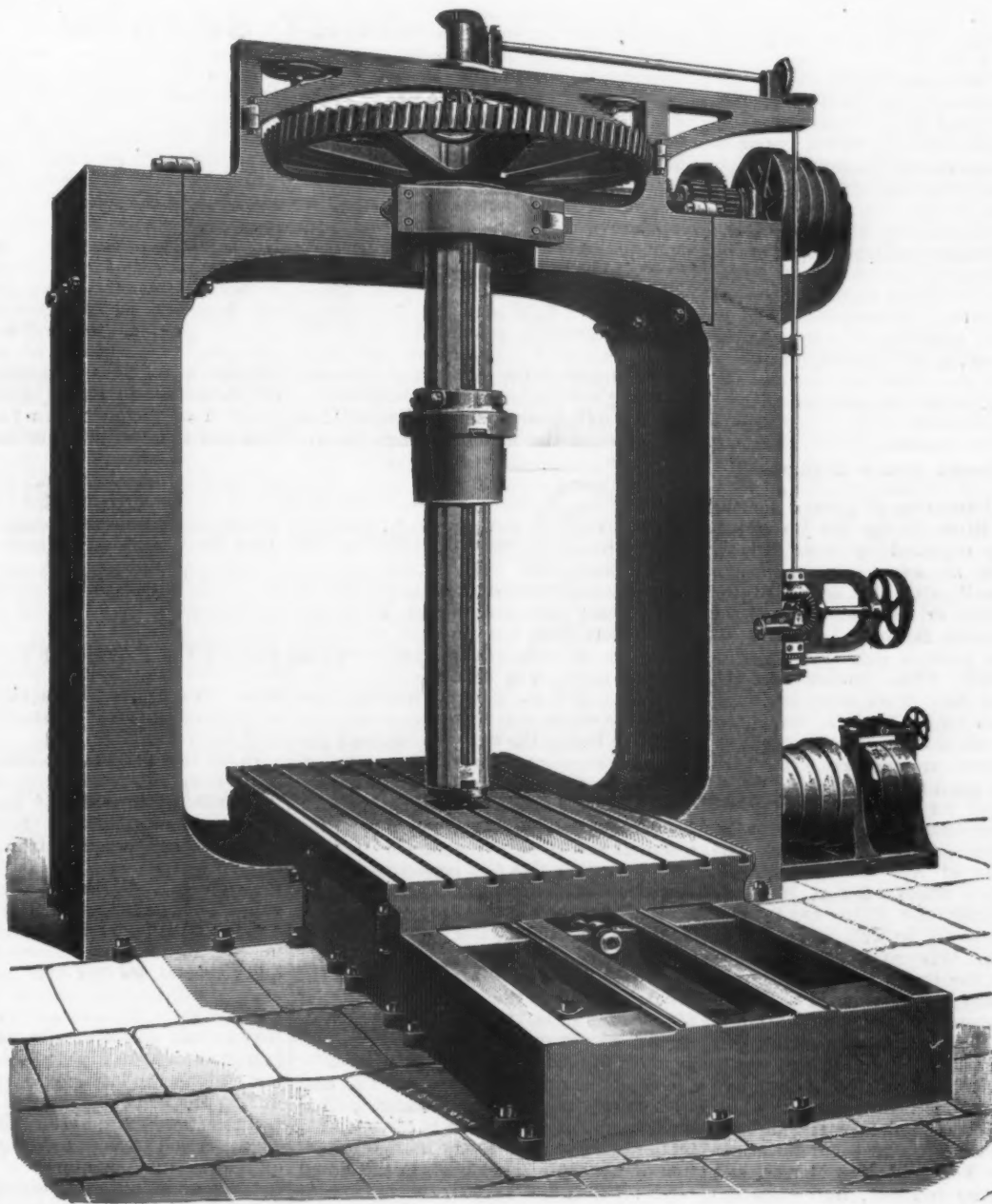
THURSDAY, DECEMBER 31, 1891.

The Shanks Vertical Cylinder Boring Machine.

In *The Iron Age* of May 21, 1891, we illustrated and described a vertical cylinder boring machine built by Wm. Sellers & Co. (Incorporated) of Philadelphia for the Newport News Shipbuilding and Dry Dock Company. That machine was ca-

or feed gear. The feed was varied by a set of change wheels and could be set for any desired motion in either direction, to bore from the top down or from the bottom up. The necessary power was provided by a small high-speed engine attached to one of the standards. Power was transmitted from the driving cone to the boring bar through straight spur and bevel gearing.

work is over 13 feet and the height 12½ feet. The traveling table for holding the work is 8 feet wide and 14 feet long. It will be seen from the illustration that no head room is required for lifting the boring bar to clear the work, because when the table is traversed to the front the crane can drop the cylinder upon it clear of the machine. The boring bar, with the worm wheel attached to it, is then placed



THE SHANKS VERTICAL CYLINDER BORING MACHINE.

pable of boring cylinders 48 inches to 108 inches in diameter and was provided with a double facing head, each having a compound slide rest, to face 120 inches in diameter. The vertical standards were 13 feet apart and the height from the sole plate to the underside of the boring head, when in its highest position, was 10 feet. The boring heads could be raised or lowered by hand or power, and had feeds varying from $\frac{1}{8}$ to $\frac{1}{4}$ inch or more, if desired. The boring bar was so arranged that it could be lifted out through the top without disturbing either the driving

In contrast with this machine, which may be said to represent American practice, we here present an illustrated description, taken from our esteemed contemporary *Engineering*, of a vertical cylinder boring machine built by Thomas Shanks & Co. of Johnstone, near Glasgow. The description is as follows, reference being had to the accompanying engraving:

We believe it is the largest machine of this class ever made; it has three interchangeable boring bars of 18 inches, 12 inches and 10 inches in diameter respectively. The width of framing for the

inside the cylinder, and both are traversed back into position on the machine. Any final adjustment which may be required is then performed. No alteration of the upper structure with regard to the feed is required, as the connection is at once made when the bar is fixed. Any feed and any driving power is obtained by a simple change, not occupying more than a minute of time, and the boring blocks can be elevated or lowered quickly by power through friction clutches, or slowly by hand, the attendant having full control from the work table, whether the bar is rotating or

is at rest. The changes of gear allow of work to be bored varying from 11 inches in diameter up to 130 inches in diameter, while the surfacing range extends to 144 inches in diameter. The illustration shows only a conical socket with heavy collar fitted on four scraped surfaces upon the bar, and kept tight by gun-metal wedge strips, but the machine is fitted with a complete series of boring blocks, each bored to fit the taper socket, and with four tool holders arranged to vary the diameter of cut up to 12 inches. These blocks are further fitted with two interchangeable surfacing compound slide rests, which are readily detached after the cylinder is faced and recessed. The weight of the machine with the 18-inch bar is 52 tons. The two interchangeable smaller bars weigh 8 tons, the boring and surfacing apparatus weigh 10 tons, so that the complete weight of the machine is 70 tons.

It will be noticed, by comparing the above descriptions, that the foreign machine is provided with a movable table upon which the cylinder to be bored is placed and then brought in position to be bored, the upper bearing of the boring bar opening to receive the bar. In the American machine the bar was lifted out of the way. The former machine is driven by belt while the latter carries its own power in the shape of a steam engine. One of the most important differences we find in the manner of operating the boring bar. The worm gearing of the foreign machine is replaced in the American machine by spur gearing, which is considered more efficient and durable.

The North River Bridge.

The formal breaking of ground for the great North River Bridge has just taken place and is regarded by those directly concerned as an event of importance comparing well with the laying of the Atlantic Cable or the building of the Canadian Pacific Railroad. Andrew H. Green, in his address delivered on that occasion, said: "The illusion that the prosperity of New York depends principally upon her foreign trade is being dissipated, and while we would, by all proper means, augment our commerce with other countries, we must no longer delay facilities demanded for our own. The greatness and prosperity of cities are not dependent upon foreign commerce. The historic cities of Asia and Egypt were interior cities. Paris, Berlin, Moscow, Vienna, Madrid and Cairo are interior cities, and there are, as well, many of our own thriving Western cities that live chiefly upon the traffic that comes from their own vicinage. A view of the commercial development along our Atlantic Coast shows that cities that have the best approaches by land routes are necessarily the ones that have greatest growth and prosperity, and not those primarily provided with best sea approaches and harbors. It is evident that bridge communications between New York and New Jersey, and her neighboring territory, have been too long delayed. The disadvantages heretofore attending this condition can now be obviated by the marvelous triumphs of modern engineering. From her position New York is the *entrepôt* and thoroughfare of the great regions to the north, east and west, and all that is needed to perfect the bounty of her opportunities is the consummation of the work now inaugurated."

Two suits, aggregating \$110,000, have been begun in the District Court at Omaha, Neb., against the American Water Works Company. On attachments issued the sheriff took possession of the entire local plant. The plaintiff in both suits is the Shickle, Harrison & Howard Iron Company of Missouri. The Denver plant has also been attached.

Production of Ammonia, Tar and Heating Gas.

BY ALPHONSE HENNIN, SPRINGFIELD, ILL.

The formation of ammonia during the distillation of coal in closed retorts is well known by gas manufacturers. The phenomena which produce the ammonia are, however, less known, because the study of the percentage of nitrogen in the coal and of the transformation of that nitrogen into ammonia is of comparatively recent date. It is only since the practical extraction of ammonia has acquired some importance that the scientists have given particular attention to the question.

The ammonia does not exist as such in the coal, or at least, the traces found in a native state are so small that they must be considered as an insignificant quantity. Nevertheless, it is found that as soon as the coal reaches a temperature of about 1800° F. in the retort a large quantity of ammonia is present in the gas, and this phenomenon lasts as long as any volatile matter is distilling. Higher temperature does not seem to render the distillation more active nor increase the quantity of ammonia, but as soon as the temperature lowers below the bright red heat the ammonia disappears from the products of distillation. This goes to demonstrate that the ammonia in the distillation of coal is a secondary product resulting from a combination of the elements of the coal, occurring only under certain conditions.

It is a well-known fact that ammonia is formed when the nitrogen meets the hydrogen in its nascent state, or when both meet in their nascent state.

The nitrogen exists in the coal in the proportion of 1½ to 2 per cent., and appears to be one of the constituents of an organic compound. The formation of ammonia takes place when the coal reaches the bright heat; a distillation made below that temperature does not produce ammonia. Some nascent hydrogen must be in contact with the nitrogen at that particular temperature. It is not derived from the hygrometric water, for that water is vaporized long before the coal has reached the proper temperature for the formation of ammonia. On the other hand, the hydrogen of the coal exists in combination with the carbon, and is set free only during the reactions known as pyrogenous. It cannot, then, from this fact participate in the formation of ammonia. There must be another source of hydrogen, and it is found in the water of the combination of the coal. It is known that that water vaporizes only when the decomposition of the coal is already far advanced. From this fact and the preceding remarks it seems evident that the ammonia is formed during the distillation by the combination of nitrogen of the coal with the hydrogen of their water of combination. This conclusion is corroborated by the fact that only a very limited formation of ammonia takes place in the closed retort; it does not exceed 10 per cent. of the total nitrogen of the coal. During the process of coking with recovery of by-products in ovens of retort type, the production of ammonia is also very low for the same cause. In blast furnaces, however, where raw coal is used and although all of the coal is consumed, the production does not exceed 15 per cent. of the total nitrogen of the coal, and it seems to be in proportion with the increased supply of hydrogen derived from some water of combination existing in the iron ore and flux, and perhaps from water carried into the furnace with the air blast.

The production of ammonia in the process of manufacturing gas is a matter of great interest. If all the nitrogen of the coal could be converted into ammonia the value of this product itself would give

handsome profits on the operation. Indeed, a coal containing 1½ per cent. of nitrogen would produce, per ton, ammonia equivalent to 164 pounds of sulphate, which, at the actual price, would represent \$5.

The result is, however, not attainable in practice and it is absolutely impossible in the manufacture of illuminating gas, because it is not possible to reach the totality of the nitrogen without consuming the coke, which retains about 50 per cent. of that element, and because the luminosity of the gas has to be taken care of.

Long ago Dr. Grouven demonstrated beyond doubt that in a large excess of steam, when the necessary conditions of temperature, time and contact are supplied, the nitrogen of the coal is converted into ammonia. When it is considered that this process of converting the nitrogen into ammonia involves the decomposition of water by carbon, the oxidation of carbon in carbonic acid and carbonic oxide, and the liberation of hydrogen, it is evident that there are there the elements of a process for producing simultaneously large quantities of ammonia and heating gas of high calorific value. Between this theoretical reaction, so well illustrated by Dr. Grouven in his analytical method of the determination of nitrogen, and an economical manufacturing process, there are, however, many difficulties to overcome. The temperature at which the nitrogenous compounds of the coal liberate the nitrogen is evidently suitable to decompose the water and produce the combination of nitrogen with nascent hydrogen, but that temperature exceeds 1800° F., and is considerably above the temperature of the decomposition of the ammonia in ordinary condition. Dr. Grouven uses quantities of steam equal to 20 or 30 times the weight of the substance. This is absolutely impossible in practice. Not only such proportions of steam could not be economically used, but it would require an external heating of the coal to maintain the proper temperature, and this fact alone renders its application impossible. Nor can any large excess of steam be applied without decreasing considerably the value of the gas.

In the distillation of bituminous shales in Scotland steam has long been applied with success in view of increasing the production of ammonia. It has also been applied to coal in gas generators, with the production of ammonia as the main object, the resulting gas being of little or no value for metallurgy. Lately the use of a very limited volume of steam with air in the ordinary producers has become quite general, for the sole purpose, however, of utilizing the heat of the primary combustion to disassociate water and impart to the gas a certain percentage of energy which would be otherwise lost, but without the intention or result of producing ammonia. None of these processes realized the simultaneous production of ammonia and such heating gas as is required in the metallurgy of iron, steel, &c., where rapidity of heating and melting with the lowest percentage of waste is the primordial condition.

These results, after several years of study and experiments, encouraged and helped by Charles and Wm. Barret Ridgely, president and vice-president of the Springfield Iron Company, I have accomplished. My process (United States patent No. 459,193, September 8, 1891) embodies the formation of ammonia equal to one-half to three-fifths of the nitrogen of the coal, or three to four times as much ammonia as is produced in the most efficient destructive distillation, the production of an almost ideal gas for regenerative gas furnaces, either for heating or melting, glass furnaces, &c., and in addition the recovery of some seventeen or twenty odd gallons of tar. I use ordinary soft coal in

an appropriate generator and when it is heated to the bright red heat needed to liberate the nitrogen from its organic compound, I inject through tuyeres with a limited amount of air a certain volume of steam, which, decomposed by the carbon, forms carbonic acid, carbonic oxide and a large quantity of hydrogen. All of the nitrogen present during this decomposition unites with the nascent hydrogen to form ammonia, and the largest part of the hydrogen remains free in the gas. During the decomposition of the steam by the carbon numerous secondary reactions occur, some developing heat, formation of ammonia, &c., some absorbing heat, so that when the steam is properly diffused, superheated and uniformly injected through tuyeres converging to the center of the glowing mass, a very limited

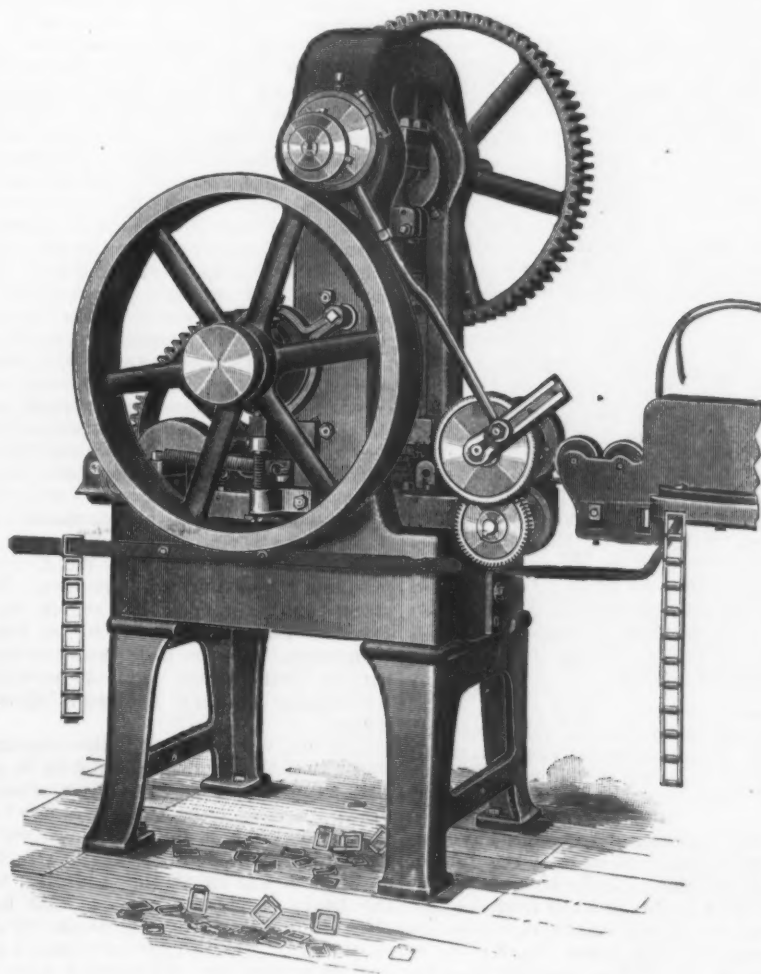
possesses high calorific value, as is shown by the following analysis:

Carbonic acid.....	10.50
Carbonic oxide.....	20.00
Methane and homologs.....	4.50
Hydrogen.....	38.00
Nitrogen and oxygen.....	27.00
Total.....	100.00

In addition to the above results, some 17 to 20 odd gallons of tar are recovered, and contribute largely to defray the expenses of the operation.

The Toledo Chain Link Machine.

The illustration shown on this page is a machine recently brought out by the Toledo Machine and Tool Company of Toledo,



THE TOLEDO AUTOMATIC STEEL CHAIN LINK MACHINE.

amount of air is needed to maintain the constant high heat required, without alteration or intermission of steam and air.

When the operation is properly conducted, and skill and judgment are applied in the regulation of the temperature in the different zones, with the proper depth of coal; when the gases are removed from the generator with sufficient velocity under vacuum, the ammonia formed, diluted with the other gases in a proportion of 1 to 1000 or more, is not decomposed, and is collected during the washing, condensing and scrubbing. Under these conditions the yield of ammonia corresponds to, say, 50 to 60 per cent. of the total nitrogen of the coal, and can be collected after distillation from the water of condensation in concentrated crude liquor, sulphate or any other form desired.

The volume of the gas produced per ton of coal can be estimated at 150,000 cubic feet. The gas resulting from the operation is practically free from sulphur and

Ohio, for the manufacture of link belting made from sheet steel.

The machine is automatic in its movements throughout, being so built that it is adjustable for different sizes of links. The steel is fed from the roll or coil by an automatic roll feed, bringing the end of the coil about midway on the die when the first stroke of the press comes down and perforates the link. In the upward movement of the slide the stock is again fed forward the space of one link, and in the second downward stroke of the slide the link is formed and end turned down at the same time a ram on the back side of the machine is forced up against the turned end of the link, which forms the hook. When the slide and ram retract, an automatic knockout comes into action which forces the link from the dies at the same time the stock is being fed forward for another link. In this manner it will be noticed that one complete link is made at each stroke of the press after the first

link has been made. The speed is about 40 strokes per minute. Weight of this press is about 7000 pounds.

This machine was built for manufacturing links patented and owned by the Dayton Steel Chain Company of Dayton, Ohio, and the press is now in operation by that company.

The Great Gossan Lead of Virginia.

BY EDGAR C. MOXHAM, M.E., PULASKI, VA.

The great gossan lead is one of the most interesting and most valuable of the many mineral deposits of southwest Virginia—great in view of the many millions of tons of ores it contains, remarkably interesting in its geological and mineralogical features, and valuable in the excellence of its ores from a commercial standpoint. It is unquestionably destined to play a most important part in the development of this section of the country.

Traversing Carroll County, it extends from the edge of Floyd County, in a northeasterly direction, into Grayson County, over a distance of some 23 or 24 miles. In general character it is a fissure vein, regularly developed between distinctly defined hanging and foot walls, with a pitch to the southwest, usually of about 45°. The containing and surrounding formation consists mostly of soapstone, micaceous and talcose slate, quartz, &c., the quartz mostly being found in and adjacent to the foot wall. The lead is traversed at intervals throughout its entire length by ravines, by which the gossan is exposed on each side of the hill, and the mundic generally seen in the creek beds. To be properly understood, the lead must be regarded as a great continuous vein of mundic (iron pyrites), the upper portion of which has become decomposed, and now presents itself in the form of gossan or brown iron ore (hydrated peroxide of iron). The line of decomposition at which the pyrites and the gossan separate is marked and distinct to a degree, the pyrites serving as a hard and excellent "bottom" to the gossan. It is found that the chemical analysis of the gossan which lies immediately down upon the pyrites differs in no material degree from the gossan which is taken from upper parts of the vein or at the surface.

Lying between the pyrites and the mundic was found the black oxide of copper, and in the past very extensive mining operations were done on the lead in quest of the copper, which is said to have been quite considerable in quantity and of rich quality, and in these operations drifts were driven on the hanging wall and upon the mundic from hill to hill along the greater part of the lead and in many places across it. The green carbonates of copper were also worked, although to a lesser extent, and it is known that the sulphurets of copper were followed down into the mundic at points to quite a considerable extent, and with profit to the miners. It is regarded as more than probable that valuable veins of the sulphurets of copper will in the future be found and developed on the lead, although the bulk of the soft ores have perhaps been already removed. We will not, therefore, attach undue importance to the matter of copper, but will deal with the pyrites and the gossan, which the drifts made by the copper miners have served to so admirably develop, extending as they do for miles into and across the lead.

The gossan—or decomposed sulphurets—is, as above described, a splendid cap or string of brown iron ore, varying in width from 12 to 40 feet at the surface and 40 to 70 feet at the bottom, where it makes its juncture with the pyrites, and varying in height from 40 to 175 feet, according with the height of the hills it is traversed.

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The nitrogen exists in the coal in the proportion of 1½ to 2 per cent., and appears to be one of the constituents of an organic compound. The formation of ammonia takes place when the coal reaches the bright heat; a distillation made below that temperature does not produce ammonia. Some nascent hydrogen must be in contact with the nitrogen at that particular temperature. It is not derived from the hygrometric water, for that water is vaporized long before the coal has reached the proper temperature for the formation of ammonia. On the other hand, the hydrogen of the coal exists in combination with the carbon, and is set free only during the reactions known as pyrogenous. It cannot, then, from this fact participate in the formation of ammonia. There must be another source of hydrogen, and it is found in the water of the combination of the coal. It is known that that water vaporizes only when the decomposition of the coal is already far advanced. From this fact and the preceding remarks it seems evident that the ammonia is formed during the distillation by the combination of nitrogen of the coal with the hydrogen of their water of combination. This conclusion is corroborated by the fact that only a very limited formation of ammonia takes place in the closed retort; it does not exceed 10 per cent. of the total nitrogen of the coal. During the process of coking with recovery of by-products in ovens of retort type, the production of ammonia is also very low for the same cause. In blast furnaces, however, where raw coal is used and although all of the coal is consumed, the production does not exceed 15 per cent. of the total nitrogen of the coal, and it seems to be in proportion with the increased supply of hydrogen derived from some water of combination existing in the iron ore and flux, and perhaps from water carried into the furnace with the air blast.

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handsome profits on the operation. Indeed, a coal containing 1½ per cent. of nitrogen would produce, per ton, ammonia equivalent to 164 pounds of sulphate, which, at the actual price, would represent \$5.

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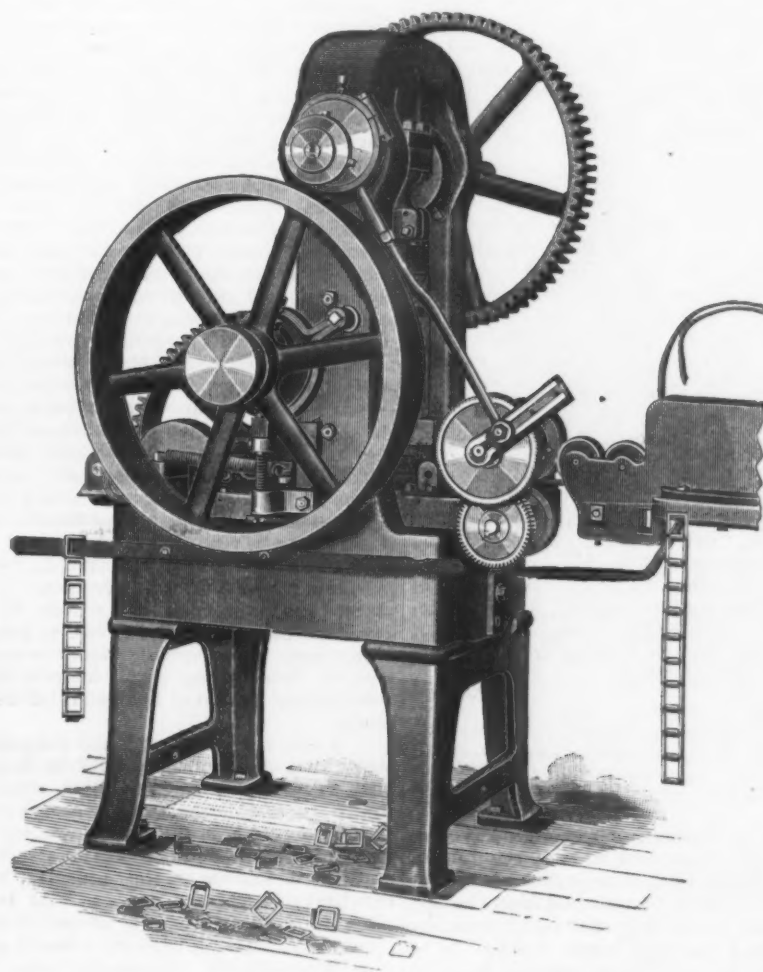
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The great gossan lead is one of the most interesting and most valuable of the many mineral deposits of southwest Virginia—great in view of the many millions of tons of ores it contains, remarkably interesting in its geological and mineralogical features, and valuable in the excellence of its ores from a commercial standpoint. It is unquestionably destined to play a most important part in the development of this section of the country.

Traversing Carroll County, it extends from the edge of Floyd County, in a northeastwardly direction, into Grayson County, over a distance of some 23 or 24 miles. In general character it is a fissure vein, regularly developed between distinctly defined hanging and foot walls, with a pitch to the southwest, usually of about 45°. The containing and surrounding formation consists mostly of soapstone, micaceous and talcose slate, quartz, &c., the quartz mostly being found in and adjacent to the foot wall. The lead is traversed at intervals throughout its entire length by ravines, by which the gossan is exposed on each side of the hill, and the mundic generally seen in the creek beds. To be properly understood, the lead must be regarded as a great continuous vein of mundic (iron pyrites), the upper portion of which has become decomposed, and now presents itself in the form of gossan or brown iron ore (hydrated peroxide of iron). The line of decomposition at which the pyrites and the gossan separate is marked and distinct to a degree, the pyrites serving as a hard and excellent "bottom" to the gossan. It is found that the chemical analysis of the gossan which lies immediately down upon the pyrites differs in no material degree from the gossan which is taken from upper parts of the vein or at the surface.

Lying between the pyrites and the mundic was found the black oxide of copper, and in the past very extensive mining operations were done on the lead in quest of the copper, which is said to have been quite considerable in quantity and of rich quality, and in these operations drifts were driven on the hanging wall and upon the mundic from hill to hill along the greater part of the lead and in many places across it. The green carbonates of copper were also worked, although to a lesser extent, and it is known that the sulphurets of copper were followed down into the mundic at points to quite a considerable extent, and with profit to the miners. It is regarded as more than probable that valuable veins of the sulphurets of copper will in the future be found and developed on the lead, although the bulk of the soft ores have perhaps been already removed. We will not, therefore, attach undue importance to the matter of copper, but will deal with the pyrites and the gossan, which the drifts made by the copper miners have served to so admirably develop, extending as they do for miles into and across the lead.

The gossan—or decomposed sulphurets—is, as above described, a splendid cap or string of brown iron ore, varying in width from 12 to 40 feet at the surface and 40 to 70 feet at the bottom, where it makes its juncture with the pyrites, and varying in height from 40 to 175 feet, according with the height of the hills it is traversing.

ing. The higher and more rugged the hills the greater is the depth of the gossan, the pyrites, as a rule, remaining in place with comparative uniformity. Having little or no cover, the gossan can be traced by surface showing for miles across the country; its general character is varied, however, at several places in a most remarkable manner, as at "Betty-Baker," "Blair," "Lineberry" and "Great-Outburst," by disturbances which appear in the form of the large bodies of splendid gossan, presenting themselves without cover and extending over many acres—immense boulders and crusts of solid ore—making an exhibit of the most impressive character, and giving an appearance of being mountains of solid ore. Nor, in fact, does investigation prove them to be altogether otherwise. While in some instances the ore when so found has proved to be of less depth than was expected, and to assume the nature of a blanket of inconsiderable depth, and to be somewhat interspaced with strings of slate and quartz, still even the most disappointing of these has developed a truly wonderful tonnage of rich ore, while others of such outbursts have proved to be all that could have been anticipated. At the "Great Outburst" the face of solid ore which has been developed and is now being actually worked is truly surprising and certainly exceeds anything else of the kind in Virginia, while at "Lineberry" the ore is known to have a depth of in the neighborhood of 175 feet, with a fine surface showing of 100 to 125 feet in width for a distance of some 4000 feet. At "Cranberry" again, the lead develops in regular fissure vein form, but assumes gigantic proportions, and will develop an average of 140 feet in depth, with a surface showing of 100 to 150 feet across the lead.

But little over a year has elapsed since railroad connection was made with this lead and it is now being worked at two points, its extremities. It has not yet been fully developed (excepting by the copper miners' drifts above referred to), and the mines are producing only 800 to 1000 tons per day, but their importance is already realized by the furnaces, every furnace within 250 miles of the lead, with but two exceptions, using from 25 per cent. upward of their mixture from this source. It is found to be a most excellent ore with which to mix the other ores of the district, particularly the hard, brown ores of the Potsdam series (mountain ores, high in phosphorus and manganese, but comparatively cheap in price), which could not otherwise be used to anything like the same extent. It is said to give character and strength to the iron, and is easily reduced, assisting the working of the furnace and being economical in fuel. As it is porous in structure it contains somewhat more moisture than the limonite and mountain ores, but it is not found to be high in silica, and such gangue as it carries, being of micaceous matter mostly, is light in weight and not costly to the furnace. It is said that it is found to assist in obtaining a uniformly large percentage of foundry iron from the furnace. Occasional samples of gossan will run as high as 47 to 48 per cent. iron in natural condition, and some disappointment has arisen from the fact that shipments have not shown as high an average as was expected from the examination of the well-weathered samples collected from the surface before railroad connection was made to the mines, some of which samples ran as high as 50 per cent. A fair average of shipments, as sent from the mines, will show as follows:

	Per cent.
Iron, natural condition.....	41.28
Silica.....	9.74
Manganese.....	0.306
Phosphorus.....	0.064
Sulphur.....	1.13
Copper.....	0.293

A great deal has been said as to the nominal figures at which gossan can be produced for the market, most of which must, unfortunately, be contradicted. The mining of this ore is not without at least a share of the troubles and expenses incidental to all other mining operations. Intrusions of quartz and slate are often found in the vein, which are tedious and costly to move and separate; much fine ochreous matter is found in the vein, which has to be extracted, and with other fine ore coming from the surface or walls of the cut, and containing more or less slate, &c., has to be carefully separated and either set aside or washed. The hanging wall of the cuts is found to be quite soft and rotten; as some of the cuts are exceedingly deep, a very large portion of this hanging wall has to be removed in order to give the cuts a safe slope. Therefore those who predicted that the producing of gossan would be simply a matter of quarrying, and expected that it would be done at very close figures, are proved to have been mistaken; nevertheless the ore is being supplied to the furnaces at prices which, considering the value of the ore, must be said to be low.

The mundic—or undecomposed sulphur—must be considered as representing the great bulk of the mineral. It underlies the gossan as above described, is from 60 to 300 feet wide, and of depth not as yet determined, but supposed to be practically indefinite, no hole having gone deep enough to indicate any limit to its depth. It is sufficient to say that enough material lies here, exposed to sight, to furnish the world with sulphur for years to come, and the use of it in the manufacture of sulphuric acid and of fertilizers is simply a question of time. As exposed by the drifts of the copper miners the mundic lies with comparatively little unevenness, but with a slight elevation toward the center of the hill, as approached from each side. As far as investigation of the ore has yet been carried, it must be regarded as pyrrhotite, or magnetic pyrites, as sample given as coming from the surface shows as follows:

	Per cent.
Sulphur.....	34.00
Copper.....	0.866
Iron.....	53.15
Phosphorus.....	No trace.
Manganese.....	0.306
Silica.....	2.99

This is, however, one among many samples, and is selected more in the light of a safe sample than as indicative of the best results likely to be obtained from the surface, and not at all what may reasonably be looked for at a lower depth. As to whether or not richer material is to be looked for below the surface is a question which has not yet been determined. Whether or not the large amount of sulphur will be used, the main value of this wonderful lode will not become effective until a process is developed by which the sulphur will be extracted from the ore upon a large scale and at such cost that the "residue" or "blue billy" will be available for the making of pig metal. Experiments having in view the expulsion of the sulphur in one of the improved kilns have not as yet proved as successful as could be wished, although after the ore has received a preparatory roasting in piles in the open air it can probably be successfully treated in a roasting kiln.

Considerable sulphur can be driven off by such pile burning, as will be seen as follows:

	Per cent.
Lump Ore Roasted.	
Iron.....	55.50
Sulphur.....	7.69
Fine Ore Roasted.	
Sulphur.....	5.51
Iron.....	48.99

Doubtless such material as the above could be completely prepared by further

treatment, but it has yet to be determined how to perform the whole process upon a commercial scale. It is hardly necessary to draw attention to the importance of the solution of this problem to the iron manufacturers, giving, as it would, an ore running in the neighborhood of 60 per cent. iron, low silica and manganese, and no phosphorus—an ideal Bessemer stock, such as the South needs so badly.

Whatever such matters may develop in the future, and in whatever manner these ores may be used, the importance of the Carroll County lead will certainly be closely associated with the success or otherwise of the Virginia iron business, so long as iron is made here.

The L. Wolff Mfg. Company's Fire.

A disastrous fire, involving a loss estimated at \$200,000, broke out shortly before 10 o'clock on the night of the 24th inst., in the factory of the L. Wolff Mfg. Company on Carroll avenue, between Robey street and Hoyne avenue, Chicago. The building was a large three-story brick structure, occupied throughout by its owners in their business of manufacturing plumbers' supplies.

The entire building was full of metal-ware and machinery. On the first story was the warehouse, where stored away was about \$45,000 worth of manufactured stock. Above this was the factory proper, with \$55,000 worth of machinery and stock, raw and manufactured. On the third floor was the foundry, where the fire broke out. Here a number of men were at work, and so rapid was the spread of the flames that they had barely time to make a hasty exit.

The L. Wolff Mfg. Company are a corporation of long standing and doing the largest business of their kind in the country if not in the world. Their officers are: L. Wolff, president; John F. Wolff, vice-president; John Clifford, secretary. The offices and salesrooms are at Nos. 93 to 117 West Lake street and at No. 84 Dearborn street. The burned factory is but a part of their Chicago plant, the principal works being located at Lake and Jefferson streets.

L. Wolff, the president of the company, stated that the company would be in no-wise crippled. Plans had been already drawn to double the capacity of the factory by building on the space now used as yard room. The building was constructed on what is known as the mill plan, and the heavy machinery ran on solid iron piers and masonry from the ground to the third story. The salvage on this will approximate \$25,000. Completed work is stored in the various warehouses of the company to fill all existing contracts and supply the running demand until a new factory is completed. Work on this will be commenced forthwith.

The old Butler Mine on Coot Hill, 5 miles from Port Henry, N. Y., is again in operation. The Essex Iron Company have hopes of making it one of the principal iron mines in Northern New York. The company filed articles of incorporation some months ago. Gustave Sidenthal of New York is president, W. H. Searles of Cleveland, vice-president, J. W. Lewis of New York, treasurer, and O. H. Cutler of Washington, secretary. Mr. Searles, a man of experience, superintends the mines. Moriah Village is the present office headquarters of the company. A new road has been made direct to the mines. The Delaware and Hudson Railroad will put in a siding for the use of the iron company at once. The road from the pits to the railroad is down grade, and a good place for a gravity railroad, which the company will probably soon build. Until that time the ore will be drawn by teams, and it is

expected that shipments will be begun by January 1. Thirty men are now at work and the number will be increased as fast as the mines can be worked. All mechanical conveniences have been established to aid the mining. The mine is said to be very rich, the leads showing an 8-foot vein of superior Bessemer ore and another 8-foot vein of lean ore.

The Hercules Electric Motor.

The Hercules Motor, made by the Zucker & Levett Chemical Company of 40 Murray street, New York, is of the inverted horse-

of tempered copper and are carefully insulated with mica and thoroughly backed to prevent short circuiting of the strips.

Heavy Standard Milling Machine.

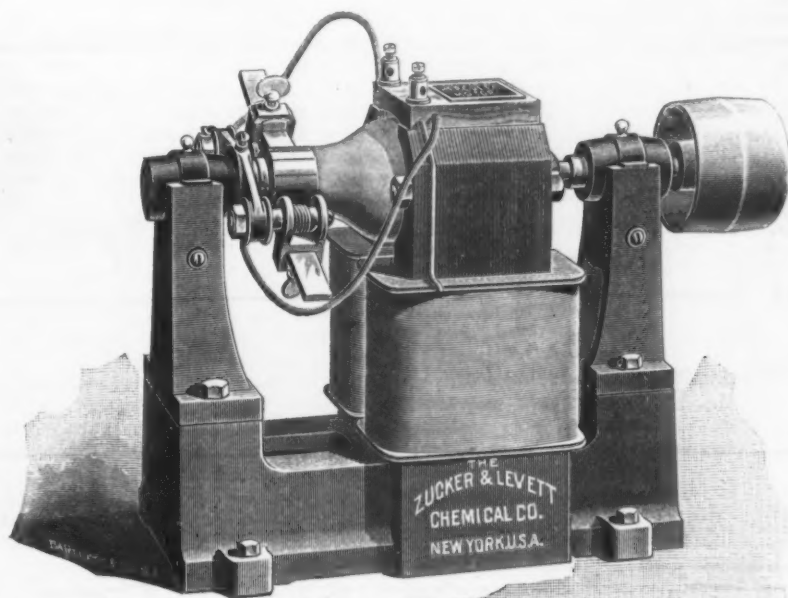
From its introduction to the present time the milling machine has gradually grown in favor as well as in size, and the uses to which it can be advantageously put have multiplied as its possibilities have been learned. It differs from the lathe, the planer and the drill; is a stand-

for 3½-inch belt through gearing in the ratio of 16 to one. The gear on the spindle is 30 inches in diameter, 3½ inches face. There are eight properly arranged speeds, from that required for a cutter 4 inches diameter to one 20 inches. The overhanging arm is 8 inches in diameter and can be removed for the use of face cutters or other purposes. The head has a horizontal movement on the top of the column for adjustment of cutters, thus dispensing with one joint below the table. The knee bearing on the standard is 20 inches wide, 26 inches long, and the table is 72 inches long, 14 inches wide, and at the lowest position from the top is 24 inches below the center of the spindle and its bearing in the knee is 48 inches long, 14 inches wide. The feed is driven by a 2½-inch belt on a four-step cone, and in connection with change gearing two changes of feed can be obtained. This is a very important feature, as it is frequently desired that the rate of feed per minute of the table should be greater when using a cutter of large diameter and consequently slow spindle speed than when using a cutter of small diameter and fast spindle speed.

As a whole this machine is a very substantial and powerful one and well proportioned to produce the maximum amount of work known to modern practice. It is built by Beaman & Smith, Providence, R. I.

The keels for two of a fleet of six whalebacks, under contract for the Canadian Pacific Railroad, have been laid by the American Steel Barge Company at West Superior. They will be 320 feet long.

It is stated on authority that the Dominion Government has decided on making some important changes in the canal now being built at Sault Ste. Marie which will greatly increase its facilities and render it able to accommodate any vessel which can use the American canal on the other side of the river. The depth of water on the lock sills of both canals will be the same, 21 feet, which will take the largest steamers used or likely to be used on the lakes. The present contract for the lock to the Canadian canal is for a lock 600 feet long



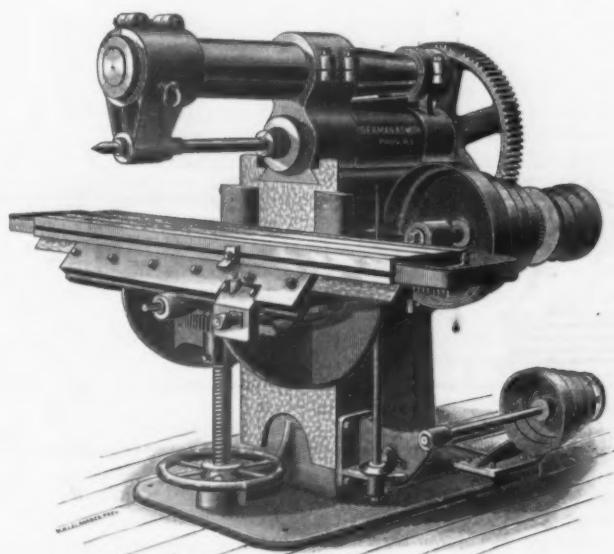
THE HERCULES ELECTRIC MOTOR.

shoe type, in which the whole of the magnetic circuit is stamped out of one sheet of Swedish iron, the number of sheets being bolted together to form the magnet frame. The plates are thoroughly insulated to prevent the generation of Foucault currents and consequent heating. The field coils are separately wound on brass spools and the distance between the magnet coils is slightly larger than twice the depth of one coil, thus allowing the same to be slipped over the core. The plate of the armature, which is of the modified Siemens type, has teeth forming longitudinal channels in its periphery in which the coils are wound. These teeth, besides reducing the magnetic resistance of the air space to a minimum, entirely prevent the coils from flying out, due to centrifugal force, and consequent burning out of armature. The magnet frame is bolted to an iron base having iron standards and self-oiling bearings, even in the smallest size of machines.

Sparking is entirely overcome in these machines, and if the commutator and brushes are kept in fair condition they will not spark under varying changes of load, even when the change is made suddenly from no load to full load. The regulation of these motors is entirely automatic. They are mostly plain shunt wound, with an armature of small number of turns and extremely low resistance. They will run at a practically constant speed under varying changes of load. The motor is simple in design and all parts requiring attention are in plain sight and easily accessible. The steel shaft is extra large in diameter and the phosphor-bronze bearings are long in proportion to their diameter, thus insuring long life and smooth running. The commutators are made

and tool in that it is made in many forms the better to adapt it to the character of work for which it is intended.

The accompanying engraving illustrates a milling machine of the so-called stand-



HEAVY STANDARD MILLING MACHINE.

ard form, but differing from the usual construction in several particulars. It is very heavy, weighing about 10,000 pounds. The spindle runs in hard bronze boxes, the front bearing being conical and 6½ inches diameter. It is driven by a four-step cone

by 85 wide. This has been changed so that the lock will be 900 feet long by 60 wide, with gates the full width of the lock. This will admit of three of the longest craft navigating the lakes being locked up together.

COPPER WELDING.

The Bevington Process.

When it was first brought to the attention of manufacturers by Mortimer McRoberts, *The Iron Age* printed a descrip-

verging revolving dies of harder metal, in which it becomes heated and compacted and acquires the shape of the interior of the die.

By employing a converging forming guide, the opposed surfaces of the ductile metal guide together like the binding guide of a sewing machine, and a tube may be made from a strip of ductile metal, which,

of the tube, the strip may be introduced obliquely and wound helically on the tube, the welding operation being conducted in the same manner in the converging die, seamless tube being the result.

Separate wires, with the ends scarfed, placed in a similar die and similarly located, become firmly welded. No fluxes are either used or required. Tubes are re-

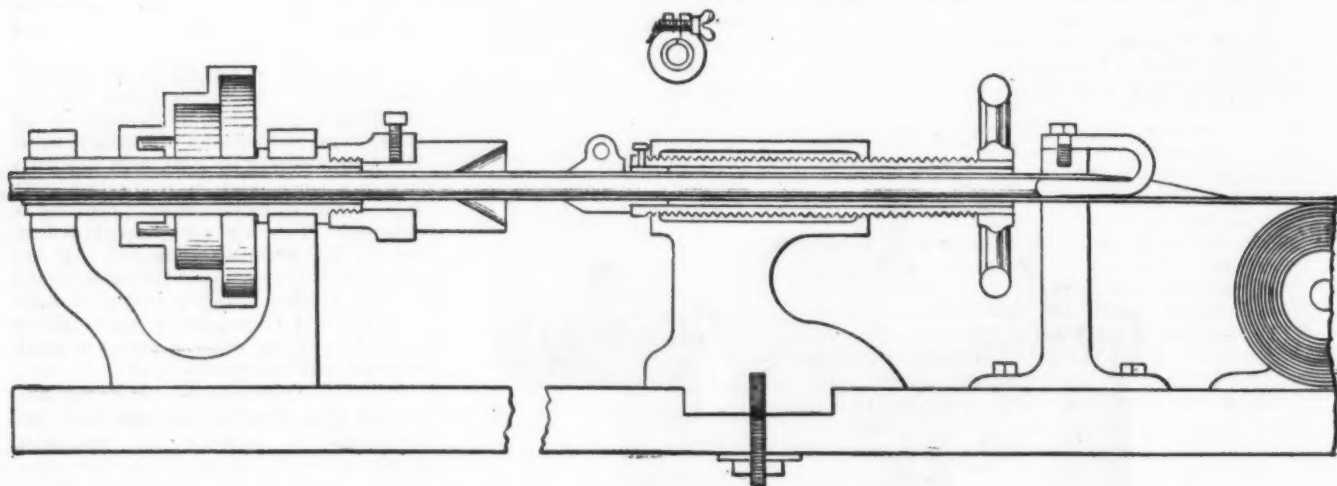


Fig. 1.—Lathe for Spinning Tubes.

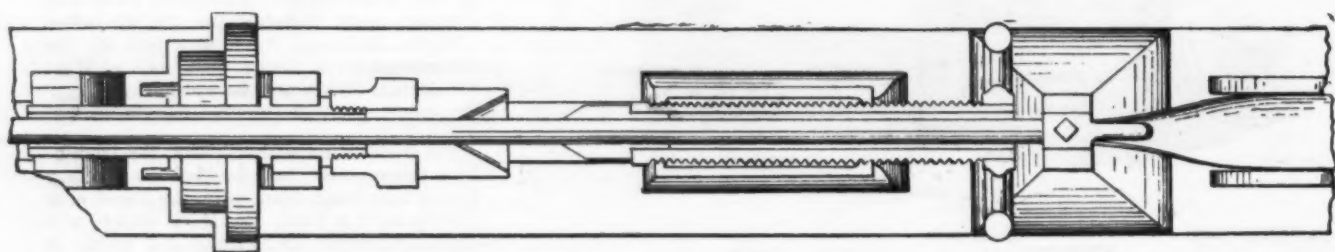


Fig. 2.—Plan of Lathe.



Fig. 15.—Tube Before Operation.

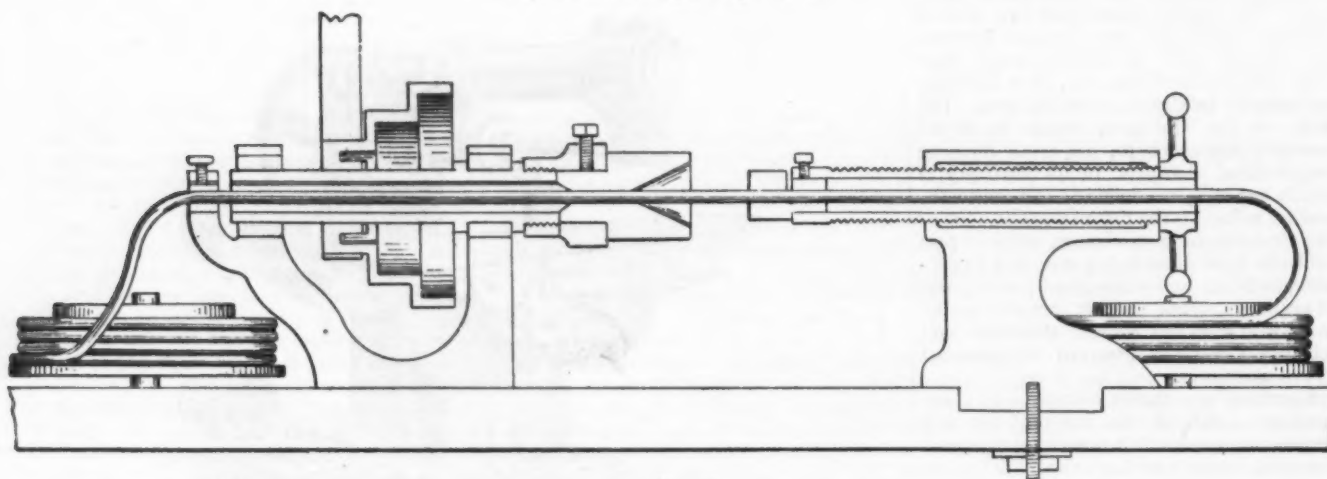


Fig. 16.

COPPER WELDING.

tion of the Bevington process, now controlled by the New Process Welding and Spinning Company of Chicago. Recently a Committee on Science and Arts of the Franklin Institute of Philadelphia, Pa., has made a report, from which we quote the following:

The invention consists in forcing strips, rods or tubes of ductile metal into con-

passing through a hollow non rotating sliding arbor in which it is clamped firmly, is forced into a funnel-shaped steel die, and becomes welded so soundly that the seam is of equal strength with the rest of the metal, and, in fact, cannot easily be detected without inspecting the interior surface.

Instead of supplying the strip of metal endwise, with edge parallel with the axis

duced in diameter and extended in length by this process, and what appears remarkable, although no core is used to sustain the metal internally, the thickness of the metal of the tube, when reduced in diameter, remains, without any material variation, the same, and the degree of temper, or hardness, and elasticity of the metal do not appear to be impaired by this process

The apparatus is shown in the accompanying engravings reproduced from the drawing of the inventor's specification.

The first illustration shows the application of the invention to contracting, and closing and welding the ends of tubes. Fig. 1 represents a sectional elevation of a lathe for spinning tubes or other straight articles according to this method. Fig. 2 represents a horizontal longitudinal section of the same in the plane of its axis, showing the die or former used in the process of reducing a metal tube to one of smaller diameter. It also shows the tube before being operated upon. Fig. 3 is an end elevation of the die or former. Fig. 4 shows a lengthwise section of the die and also a tube before reduction. Fig. 5 shows the tube and die after the tube has been operated upon. Fig. 6 is a longitudinal section of a die where it is desired to close the end of the tube. The tube is also shown. Fig. 7 is a view showing the operation completed. Fig. 8 represents the die used to weld two tubes together for the purpose of lengthening the same.

Figs. 9, 10, 11, 12, 13 and 14 represent some of the different results accomplished by the process of reducing and increasing

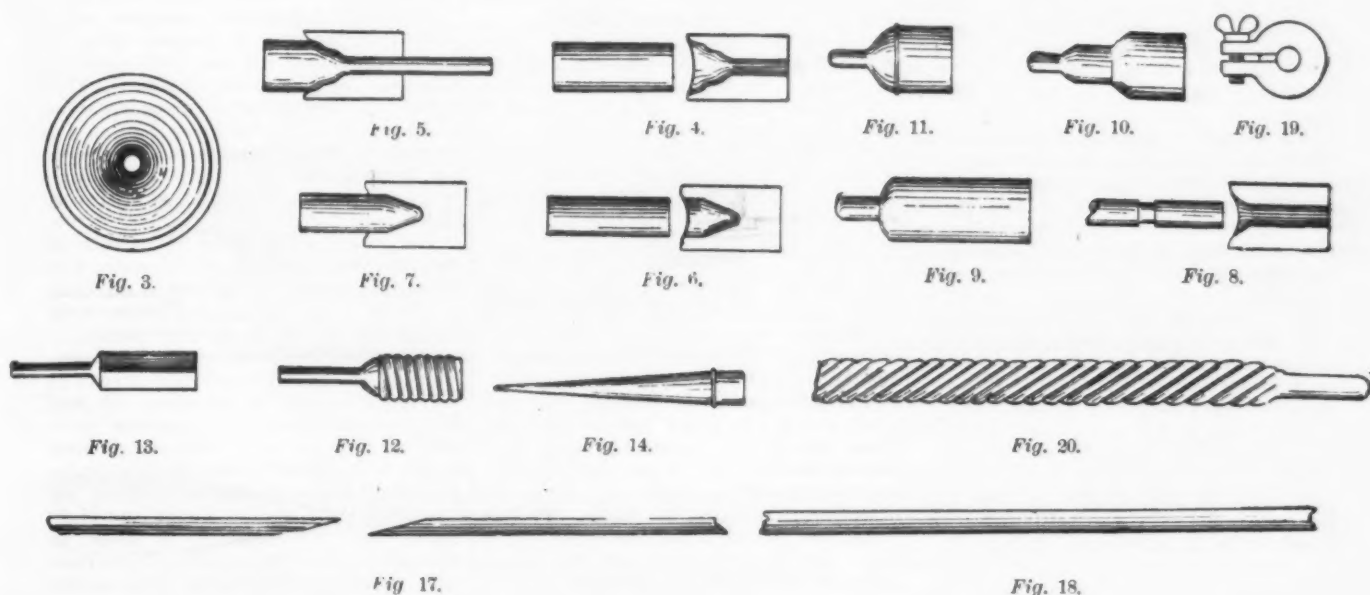
way through the die, and the wire is fastened in this position by means of the clamp at the rear of the headstock. The other wire is inserted in the tubular spindle of the headstock and passed out through the clamp a little way, and is then firmly secured in place by means of this clamp.

The arbor of the tailstock is then fed inward until the beveled end of the wire is forced into the die and brought firmly against the bevel of the other wire. The die is then very rapidly revolved by the means already explained, while, of course, the two wires are held in a fixed position and forced together. During this rapid movement of the die a very high degree of heat is developed by frictional contact, which is of sufficient intensity to heat the two ends of the wire to a welding heat and perfectly weld them together along their contact faces. The union thus obtained is as complete and perfect as a welded joint can well be made, and owing to the action of the die the joint is smooth and in fact almost imperceptible, the finished wire presenting the appearance of a smooth cylinder seen in Fig. 18.

Obviously, with the machine constructed as described above, the wire, after being

vice, for which purpose it is provided with a hand wheel on its outer end. A clamp is set in the inner end of the arbor of the tailstock, being of any suitable construction to clasp and firmly hold a round tube. It is shown in Fig. 19, in the well-known form of a divided ring with a screw for the purpose of drawing the two parts together. A standard is mounted upon the bed beyond the tailstock, and on this standard is mounted a mandrel which corresponds in size to that of the required tube.

This mandrel extends just through the standard, which is provided with an aperture for this purpose a little larger than the mandrel, its diameter corresponding to the outer diameter of the tube. At its outer end the mandrel is bent upward and backward upon itself, and this upper turn or member is fastened to the top of the standard by means of a screw body, as seen in Fig. 1, or in any other suitable way. The metal plate from which it is intended to form the tube is cut into a strip or strips of such width as to form a tube of the desired size when rolled up in a circular form with the opposite edges brought together; this strip or strips may be wound



COPPER WELDING.

the diameter and closing the ends of the metal tubes. Fig. 15 shows a detached view of a tube as partially formed from a strip of metal. Fig. 16 shows the invention as applied to welding the ends of wires or rods.

The machine adapted to carry out this process is substantially a lathe, with hollow arbors in both the head and tail stocks. A conical die is secured upon the inner end of the hollow arbor of the headstock so as to turn with it. This die is of very hard metal, and has a central perforation running through it, conical or flaring at each end, the opening at the inner end being much larger than the one at the other end.

The hollow spindle of the tailstock is screw threaded and is mounted in a threaded bearing so that it can be set in and out, for which purpose it is provided with a hand wheel. A contractible clamp is set in the inner end of this arbor, which is adapted to hold the rod or wire from turning as well as lengthwise.

The engravings show this machine in operation upon wires. The two wires are preferably prepared by scarfing or by cutting the ends upon an incline, as shown in Fig. 17, so as to give each a corresponding bevel. One of the wires is thrust through the hollow shaft and part

welded, must be drawn through at one end of the machine. For this purpose the wires are wound upon spools at each end of the machine. After welding the wire may be drawn through, being run off from one spool and wound upon the other, the clamps, of course, being loosened for this purpose, and so length after length of wire may be joined together to form a line of any length desired.

Two rods may be welded together in the same way, one being set in the headstock and the other in the tailstock, and both clamped as described.

The operation will be understood without any further explanations, the rod set in the tail stock being fed up forcibly against the end of the opposite rod.

This process of welding may be successfully applied to wires and rods of very considerable size; the process has been practically tested with entirely satisfactory results on rods of different sizes, up to 1 inch in diameter, and probably may be carried on successfully with even larger sizes.

The invention is applied to forming tubes of metal, as shown in Figs. 1 and 2.

The machine used is a lathe, as previously described, with some additional features. The tailstock is hollow and suitably threaded to serve as a feeding de-

upon a suitable drum a little in front of the mandrel standard, where the strip is shown wound or coiled upon the drum, the latter being free to turn on its axis so that the strip may be run off.

The operation is as follows: The metal strip, wound upon the drum as described, is led hence through the aperture in the standard, bent around the mandrel, by which operation it is formed up around the mandrel in the shape of a tube, the edges of the plate being brought close together, but of course not joined.

The end of this unclosed tube is carried along the tailstock; and in the revolving die, the clamp is then closed tightly upon the tube and the revolving die set in motion. The tailstock, which, in the first instance, is drawn back as far as possible, is now set up gradually, thus feeding the unclosed tube into and through the revolving die, and by the action of the hard-faced conical die, rapidly revolving, the tube is heated to a welding heat, and the edges thoroughly and completely welded together, thus closing the joint and leaving a perfectly smooth and finished surface.

The feeding of the tube through the die will, of course, draw the strip from the drum and through the forming aperture in the standard, thus continuously forming

up the tube around the mandrel during the feeding operation. With the device here shown, it is obvious that when the limit of the feed movement of the tailstock is reached, the clamp must be loosened; the tailstock is again retracted, the clamp refastened, and the feed forward is again made. The tube delivered from the hollow shaft will be a completed product, with the joint perfectly closed and smoothly finished by the action of the die, so as to present a seamless appearance. It is evident that the metal from the drum to the hollow shaft will present three different conditions; the first section between the roll and forming mandrel is straight, but with its edges gradually turning upward and inward, as seen in Fig. 2, and the second section, between the mandrel and the revolving die, will be in the form of an inclosed tube, as indicated in Figs. 2 and 15, while the last section, beyond the revolving die, will be a finished tube.

It will be seen that in carrying out the process with the apparatus herein shown and described the feed is intermittent, but that a tube can be made of any length desired. It is also evident that if a feed mechanism were applied to the tube by which the metal would be drawn through the machine by a slow continuous movement, the action of the devices would be constant, there being no intermission in the feed. Sections of welded specimens show the weld to be perfectly solid and fully equal in strength to the rest of the material.

The capacity of this invention for uses in the arts seems to your committee as almost unlimited, when circular forms of ductile metal are required. The series of helically coiled or twisted wires welded as shown in Fig. 20 is one of the many interesting specimens produced by this invention.

It has already been applied commercially, with satisfactory results, to cartridge cans for dynamite projectiles, and, so far as your committee can judge, develops fully the best strength of the material.

The invention appears entirely novel, is simple and easily managed and economical, and does not require a very costly plant, and in the opinion of your subcommittee deserves recognition by the award of the Elliott Cresson Medal.

The lake cities are much incensed by a recent decision at Washington by which iron-ship builders in that section were debarred from bidding for the war ships and cruisers of the modern navy, because of an alleged technical construction of a treaty prohibiting either Canada or the United States from keeping more than one man-of-war on the great lakes. Mayor Pingree of Detroit, in addressing the Deep Waterways Convention in that city, said: "When our lake shipyards, with their extensive plants for building steel steamships, can come in successful competition with those of the Atlantic seaboard in the construction of steel steam merchantmen (as they have done in Cleveland, Bay City and West Superior, and as they are fully equipped to do in our own city), it seems utterly unjust that they should be debarred from legitimate competition for millions of dollars of work, on a technicality, not raised or claimed by a foreign power." The purpose now is to agitate in favor of a reversal of the decision referred to, that Western builders may compete with those in the East.

The tremendous impetus acquired by a locomotive driven at high speed, and the destruction which may ensue where an obstruction is opposed, was terribly illustrated on the New York Central Railroad near Hastings, when the St. Louis express train completely telescoped a sleeping car into which it crashed, killing 11 persons outright.

WORLD'S FAIR NOTES.

Getting Machinery Free of Cost.

Exposition officials are securing, without cost, a great deal of necessary and valuable machinery for use during the fair. They are getting it because the great firms engaged in the manufacture of machinery appear to realize that it will be an immense advertisement for them to have their different varieties of machinery used in furnishing power and light for the exposition.

Mechanical Engineer Slocum of the Construction Department has been engaged recently in securing and installing the machinery necessary to furnish the 25,000 horse-power for the service of the World's Fair. The engines, boilers, belting, &c., to form the power plant will be procured for the most part from exhibitors and will be furnished without cost, inasmuch as they will be installed as exhibits. So far Mr. Slocum has secured the necessary plant for 16,000 horse power, leaving 9000 yet to be provided. Negotiations have just been closed with Henry S. Worthington for a pumping plant for service on the grounds with a capacity of 40,000,000 gallons per day. This plant consists of four pumps of the best type, and is secured free of cost. E. P. Allis & Co. of Milwaukee have offered a gigantic fore-and-aft, triple expansion, condensing engine, with cylinders 30, 58 and 88 inches in diameter, with a 60 inch stroke. From Fraser & Chalmers have been secured six large engines, developing an aggregate of 3000 horse-power. This firm will also operate one of their compound air compressors for supplying a large portion of the compressed-air power. All the feed pumps, heaters, condensers, and other appliances needed for the entire plant have been secured as exhibits and without cost. Belt manufacturers throughout the country have offered as exhibits all the belting needed. One firm will send a belt 150 feet long and 100 inches wide, which will be the largest belt, it is said, ever produced. The largest now in existence is 76 inches in width.

Manning, Maxwell & Moore of New York will equip the machine shops free of cost. Mr. Slocum says there will be no difficulty in securing everything needed for the power plant. A Chicago house has agreed to ventilate Machinery Hall.

A temporary power plant of 700 horse-power is now in operation on the grounds, and the temporary pumping plant has a capacity of 3,000,000 gallons per day. The pumps, engines and boilers were secured as exhibits.

Fifty Electric Light Contracts.

Everybody will be given an opportunity in bidding for the electric lighting at the exposition buildings and grounds. It has been decided by the Construction Department, through Electricity Engineer Sargent, to make at least 50 different specific contracts for electric lighting. This will give the electrical firms of the country, both large and small, a chance to bid for the work.

Provision has been made for an electric lighting capacity of 15,900,000 candle power throughout the exposition grounds and buildings. This will be more than twice the volume of electric light now furnished for Chicago.

In furnishing this illumination there will be employed 7000 arc lights of 2000 candle-power each and 120,000 incandescent lights of 16 candle-power each. Plans for this gigantic scheme of lighting have been completed by Electrical Engineer Sargent and Chief Barrett of the Department of Electricity. Bids for the installation of the entire plant will be asked next week, and every firm of consequence

in the country will be given a chance. All the lagoons and canals will be lighted, and the *façades* of the buildings surrounding the grand plaza in which will stand the Administration Building are to glow with incandescent lights. The Administration Building will have its sides artistically lighted by myriads of lamps, and the whole square will be a scene of brilliant beauty. One of the distinctive features of the electrical display will be that made in the main basin, which runs from the lake westward toward the Administration Building, a distance of 1500 feet. Special attention will be given to the illumination of this basin, and it will be encircled by 1650 incandescent lamps. The lamps are to be 2 feet apart and 3 feet above the surface of the water of the basin.

Extensive use of electricity is being made, and will continue to be made, on the exposition grounds wherever practicable. A temporary plant for electric lighting and power has been put in, and all the sawmills and hoisting machinery on the grounds are operated by electricity. The ultimate plans for its use call for more than ten times the amount of electric light used at the Paris Exposition.

Interior Transportation.

Intramural transit for passengers on the exposition grounds at Jackson Park has once more come up, and this time it is presumed for determinative results. Half a dozen or more different companies stand ready to furnish transportation on the grounds. These companies have been deeply interested in the subject and are ready to furnish, according to their own idea, ample facilities.

There will be at least 5½ miles of intramural track, and Chief of Construction Burnham has been authorized by the Committee on Grounds and Buildings to advertise for bids for intramural transit.

The exposition management has determined that the transportation tracks in Jackson Park shall be elevated. Beyond this there has been no expression as to whether the elevated intramural road should be operated by electricity or steam. According to one of the members of the committee there should be at least eight tracks, and the capacity of these he thought should be capable of conveniently carrying every visitor who sought to ride around the exposition grounds.

There are a number of companies seeking the privilege of carrying passengers through the grounds during the fair. The movable sidewalk company with a capacity of 40,000 passengers an hour think they should have the contract. There are also other firms who wish to show what they can do in the way of taking care of the traffic in the exposition grounds. It will devolve largely upon Chief of Construction Burnham to say what system of transportation shall be adopted.

Work on the Illinois Building.

Illinois is first to begin work on the construction of the State World's Fair buildings. On the 21st inst. the contractors, William Harley & Son, went to the park and started 60 workmen on the work of the foundations. Everything was in readiness and 14 carloads of material were on the site. An electric sawmill has been established and the Illinois State Building is to be sent skyward with great expedition.

This structure will be the finest State building on the exposition grounds. It will cost over \$200,000, an amount five or six times larger than that proposed to be expended by any other State for a special building.

W. W. Boyington & Co. are made supervising architects of the work and have appointed a building superintendent to see that the specifications are carried out

by the contractors. John P. Reynolds, the Director-in-Chief of the Illinois World's Fair Board, said that the contractors would be crowded along and that the structure would be completed in time for the dedicatory services next October.

Washington State Exhibit.

Washington will have a unique World's Fair State Building. It will be constructed almost entirely of material from the State of Washington, and it will form an illustration of the building materials and industries peculiar to that State.

The design for the structure has been approved by the Construction Department. The building will be 220 x 140 feet. The exterior will be of timber from the Puget Sound region, and all the lumber entering into it has been donated by the State Lumbermen's Association. The main entrance is to be made one of the features of the building, and will be of granite, marble, and ore quarried in the State. In addition to what may be contributed the State will expend \$50,000 in constructing and elaborating the details of the building.

he appointed the committee. The full committee is as follows: A. C. Durborow, J. B. McCreary, J. V. Riley, G. W. Houk, Ohio; Joseph Wheeler, W. D. Lagan, J. J. Little, William Cogswell, Nelson Dingley, J. McKenna, J. P. Dolliver.

The Great Plumbing Contract.

The plumbing contract secured by James B. Clow & Son of Chicago, as mentioned in our columns two weeks since, is said to be the largest ever made. According to *Domestic Engineering*, this contract calls for the placing of 3000 water closets, 2000 urinals and 1500 lavatories. About two-thirds of these fixtures will be placed in toilet rooms in connection with buildings erected by the exposition company, and about one-third will be placed in small buildings designed and to be erected for the purpose and located in various parts of the grounds, where public convenience dictates. The contract will require the expenditure of between \$450,000 and \$500,000, which makes it many times the largest contract for plumbing material ever placed in the world.

Son. They are already receiving inquiries from manufacturers looking to the use of specialties in this manner.

The plumbing for all this work will be let by an architect in Chicago, James B. Clow & Son doing none of the work themselves. They are already in receipt of letters from plumbers who wish to bid on the work. The sewers and the water supply for all the sanitary systems will be furnished by the Exposition Company.

The separate buildings will vary in size as may seem necessary from their location in the grounds, but each will contain from 50 to 100 closets, with a corresponding number of lavatories.

This contract, as a whole, was so large that while a number of firms figured on it, no one else cared to undertake the entire thing.

It is stated that one-third of the closets and urinals will be for free use.

It is now confidently believed that the arrangements now completed between the directors and James B. Clow & Son will, to a large extent, revolutionize public sanitary arrangements in our large cities. It must be admitted that in our rapid sanitary progress this is one item which has been overlooked. In London and all Continental cities these places for private use have received careful attention, while American cities are far behind the age.

New Hampshire's Mine Exhibit.

Chief Skiff of the Mines Department received from Capt. E. M. Shaw, Executive Commissioner of New Hampshire, a communication stating that it is the purpose of his State to make a striking exhibit in the Mining Department, although the State is not reckoned to be prominent in the mining world. It will nevertheless exhibit a collection similar to that at the College of Technology, a notable institution at Worcester, Mass. Chief Skiff has ready a number of plans showing the ground floor and gallery arrangements and utilization of space within the Mines and Mining Building.

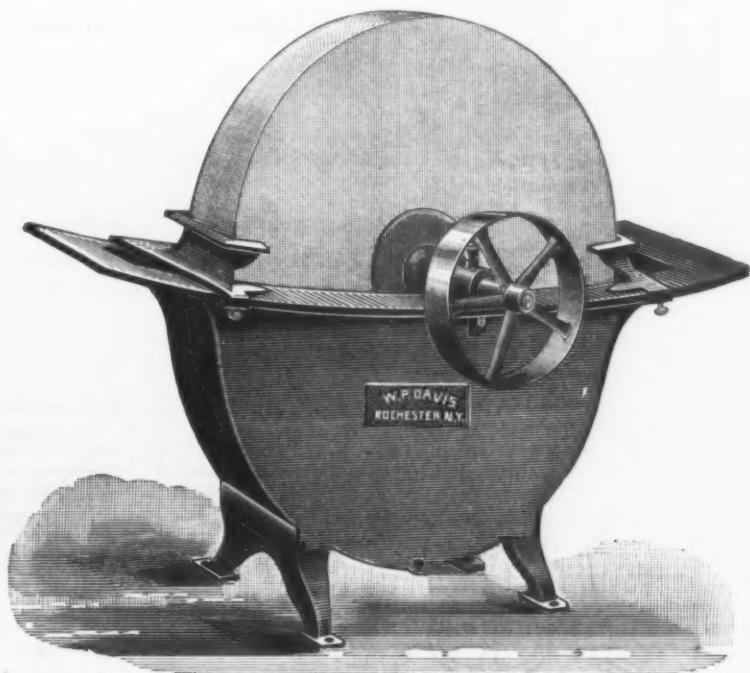
Fine Display of Locomotives.

Chief Willard A. Smith announced that he had already received applications for the display of more than 50 locomotives in the Department of Transportation. Less than 50 were shown at Paris.

The Davis Grindstone Frame.

The principal feature in the grindstone frame here illustrated and which is made by W. P. Davis of Rochester, N. Y., is found in the fact that the frame, with the exception of the legs, is cast in one piece, thereby doing away with all joints. The flange around the top is formed so as to lead the water from any part of it back into the reservoir. The rest is placed high enough above the frame to permit irregular forms to be ground without coming in contact with it, and also so that grinding can be done on the side as well as the front. There is a sleeve which passes over the arbor, one of the flanges being cast solid with this sleeve and the other slipping over it and being tightened by a nut. By this construction the stone can be adjusted, trued up and then put in place on the shaft. The driving pulley is 20 inches diameter, 5 inches face, and will carry a stone 42 inches diameter, 6 inches face.

The capacity of freight cars has increased constantly, until now the maximum capacity is 60,000 pounds and the average capacity 50,000 pounds, against 25,000 pounds five years ago and about 20,000 pounds ten years ago. Each car to-day occupies the same space on the track as before, but a blockade detains twice as much merchandise.



THE DAVIS GRINDSTONE FRAME.

It will be surmounted by a flagstaff 175 feet high, and there will be four towers of unique design. A peculiar incident in connection with the acceptance of the design for this building is that the one which at first was considered third in merit has been adopted, and the architect who received the first prize in the competition has been relegated to the rear.

The World's Fair in Congress.

Speaker Crisp has done well for the fair. This at least is the opinion of prominent World's Fair officials who have commented on the make-up of the Congressional Committee on the World's Columbian Exposition. A. C. Durborow of Chicago is chairman of the committee, and he, as well as the ten other members, were spoken of in the highest terms of praise as friends of the fair. The general feeling was that exposition interests would not suffer in the hands of this committee; and the management could not have been better suited had it dictated the composition of the committee. Director-General Davis, Solicitor-General Butterworth and Secretary John T. Dickinson were greatly pleased and did not hesitate to say that Speaker Crisp had performed a good service for the fair when

Plans are now being completed, and early in the coming year active work will commence. In all there will be 62 toilet rooms equally divided for men and women. The plans which James B. Clow & Son have prepared call for a very elaborate and surprisingly complete sanitary system.

All the rooms will be in charge of competent attendants, and all the fixtures will be cared for in the best possible manner. At no previous exposition have the fixtures ever been cared for, and public use without care soon get them into a very uninviting and even repulsive condition.

Quite naturally, manufacturers will be anxious to know what and whose materials are to be used in this enormous contract. At this date no decision has been made on these points. It is probable that different toilet rooms will be fitted up with the fixtures made by different manufacturers, thus giving different ones an opportunity to display their goods under favorable operation. If any one house should desire to fit up an entire room, and place a fine announcement of the fact on the wall, it could most likely be done, but all that is done in this direction will be under the charge and direction of James B. Clow &

STEAM BOILERS.*

BY JOHN J. HOGAN.

Two Kinds of Strains.

A boiler design is mechanically wrong which produces unnatural strains, and to make the working of such a design safe by the addition of extra material does not make it mechanically correct. It will be admitted, theoretically at least, that a boiler can be designed in which the circulation of the water and the strains due to pressure and expansion will be natural. The strength to withstand such strains can be provided for in the design without the need of a quantity of extra heavy material to strengthen weak parts and sur-

against plate C C has been affected. If the vessel were covered, the plate above B B would receive the temperature of the steam. Fig. 14 represents a vessel with one flue or passage and the description of Fig. 13 applies to it also. In each of these vessels the top plates above B B receive a temperature of 212° , as do also the plates A A, before the plates D D and C C have changed from their original temperature of 70° . The temperature of these lower plates rises slowly as the heat is transmitted downward by conduction. This is practically what takes place in the Lancashire and Cornish boilers, Figs. 2 to 5, and in other boilers of this class. The Lancashire boilers are generally 7 feet in diameter by 28 feet long. The flue tubes are 33 to 36 inches in diameter. In these flues the grates are placed at one end. To

3 (*The Iron Age*, page 1073), and then along the sides, or they are first led along the sides of shell, Figs. 4 and 5, and beneath the boiler to chimney. The object in either method is to heat the shell as uniformly as possible. The Cornish boiler, Figs. 4 and 5, is affected similarly to the Lancashire boiler, Figs. 2 and 3, except that the lower side of the flue tube is close to the bottom of the shell. There is, therefore, proportionately less water to heat to raise the temperature of the lower part of the shell.

Fig. 17 represents a vessel like Fig. 13, except that the space above A A is higher and contains flues E E E through which the heat passes which has not been absorbed at A A. Circulation is assisted between the levels A and B by the heat passing through the flues E E E, but this

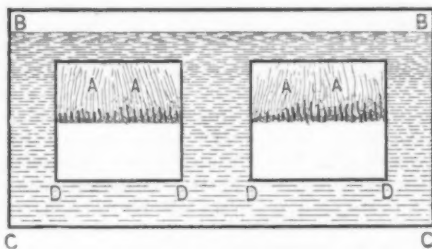


Fig. 13.—Diagram of Vessel with Partial Circulation.

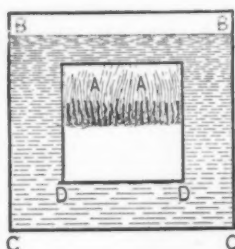


Fig. 14.—Diagram of Vessel with Partial Circulation

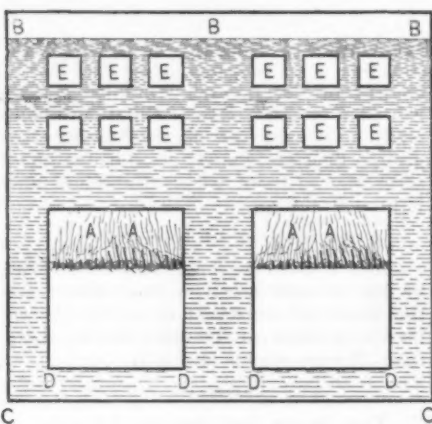


Fig. 17.—Diagram of Vessel with Partial Circulation.

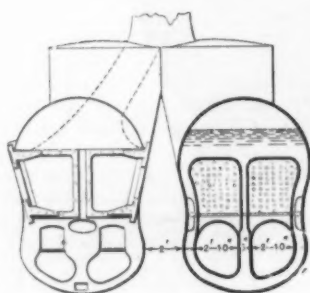
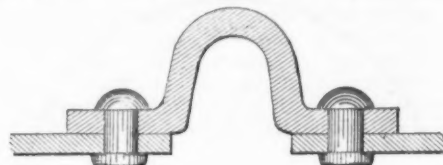
Low Pressure Marine Boilers.—
Fig. 18.—End View and Section.

Fig. 16.—Expanding Ring for Boiler Flue Tubes.

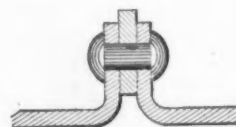


Fig. 15.—Flanged Joint for Boiler Flue Tubes.

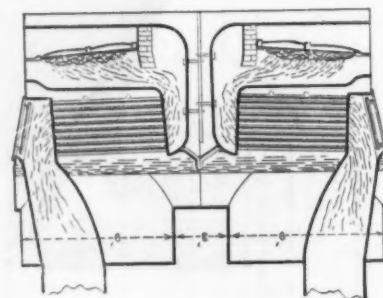


Fig. 19.—Longitudinal Section.

STEAM BOILERS.

faces which can be wholly dispensed with. The direction of nearly all improvements in the design of steam boilers up to the present time has been to add surfaces for the absorption of heat without any regard to the circulation of the water. In the construction of boilers every effort has been made to strengthen weak parts and to provide for excessive and irregular expansion of parts, difficulties which would not have been encountered at all if the design had provided proper circulation of water.

Fig. 13 represents a square vessel with two square flues as passages, A A, passing from end to end. These passages are surrounded by water to the level B B. The height of the water above the top surfaces A A is one-sixth of the total depth of water B to C. Heat is applied to the top surfaces simultaneously in the two flues. Circulation of the water above plates A A takes place immediately and steam is produced before the temperature of the water

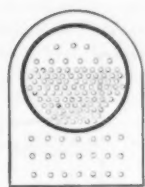
meet the irregular expansion due to the difference of temperature of too highly heated flues, and the underside of a large shell at a low temperature, several make-shifts in construction have been introduced. The circular seams or joints in the flue tubes have been flanged as shown in Fig. 15, or rings of the section shown in Fig. 16 have been used. The staying of the flat ends has been most carefully attended to, because if the rivets in the stays are too close to the flue tubes and are strong enough to withstand the strain of the elongated flue tubes, grooving or channeling takes place. The end plates around the flue tubes are left as free as safety will admit to help to prevent this grooving. The cross tubes were originally introduced as much for the purpose of strengthening the flue tubes as for improving the circulation of water. These cross tubes add more surface, but the advantages to circulation are apparently not much recognized, as provisions for irregular expansion are continued. The gases from the flue tubes are conducted beneath the shell, Figs. 2 and

3 (*The Iron Age*, page 1073), and then along the sides, or they are first led along the sides of shell, Figs. 4 and 5, and beneath the boiler to chimney. The object in either method is to heat the shell as uniformly as possible. The heating of the larger body of water contained in the vessel shown in Fig. 17 up to the same degree as obtained with the smaller quantity in the vessel shown in Fig. 13 is accomplished by the heat from the tubes E E E. This example gives some idea of what takes place in a marine boiler, Figs.

* In a recent experiment made by L. E. Fletcher, Manchester Steam Users' Association, when testing a Lancashire boiler it is reported that the temperatures in the top and bottom of boiler varied as follows:

	Temperature at bottom.	Temperature at top.	Difference.	Pressure, lbs.
Starting.....	78° F.	83.0° F.	5° F.	..
45 minutes after starting.....	80° F.	232.3° F.	142° F.	7
68 minutes after starting.....	100° F.	297.5° F.	194° F.	50
98 minutes after starting.....	117° F.	294.2° F.	177° F.	47

* Copyrighted, 1891, by David Williams, New York.



Locomotive Boiler.—Fig. 20.—Middle Section.

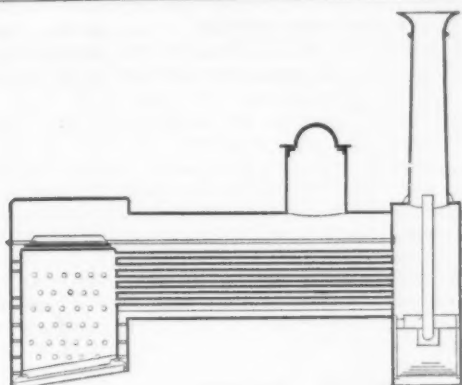


Fig. 21.—Longitudinal Section.

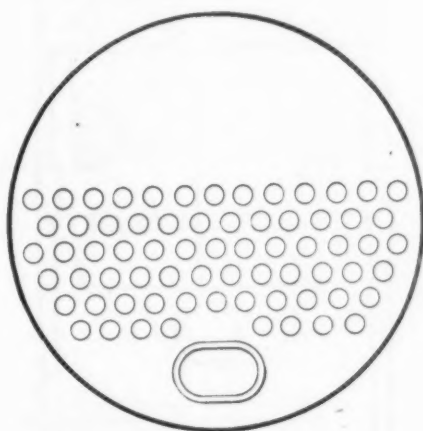


Fig. 22.—Method of Placing Tubes in Diagonally Inclined Rows.

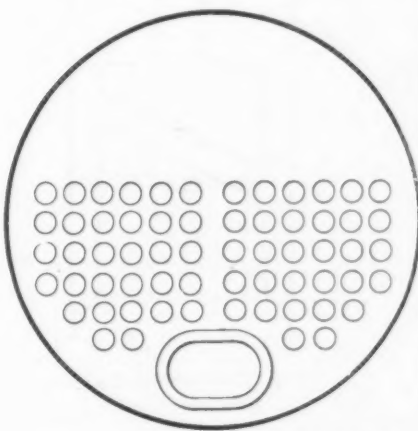


Fig. 23.—Method of Placing Tubes in Vertical Rows with Central Space.

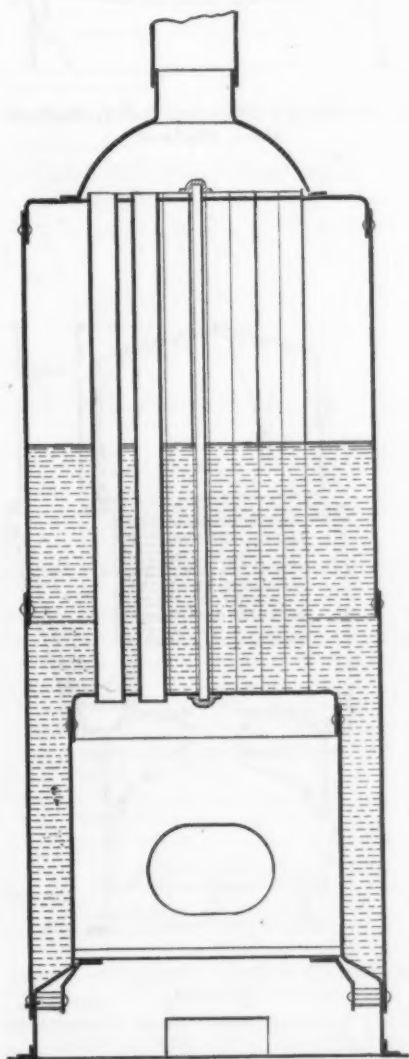


Fig. 24.—Vertical Boiler—American and English Practices.

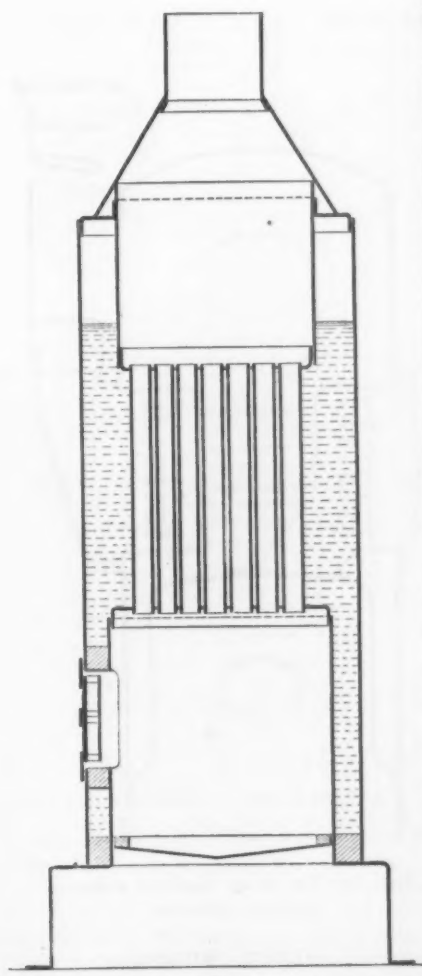


Fig. 25.—Vertical Boiler with Tubes Submerged Below Water Line.

STEAM BOILERS.

6 and 7, page 1073. The fire grates are in the flue tubes and the smoke tubes are above them. A combustion chamber at the back connects the flues with grates to smoke tubes. The marine boiler may be said to be a modification of the Lancashire boiler, with an enlarged diameter and decreased length of shell, an additional firing flue tube generally, a combustion chamber and multitubular smoke passages to make up for the reduction in length and in heating surfaces. The diameters of shells vary from 10 feet to 14 feet, the plates being some $1\frac{1}{2}$ to $1\frac{3}{4}$ inches in thickness. Their length is generally less than their diameter. The flue firing tubes are the same size as in Lancashire boilers, but they are generally corrugated for strength. The end plates are flat. The front plate being a tube plate is strengthened by stay tubes between it and the tube plate in the combustion chamber.

The crown, or top plate, of the combustion chamber is flat, as well as the back plate. The former plate is stayed by bridge or other stays, while the latter plate is stayed to the back plate of the shell. The end plates of the shell are also stayed above the water level to the shell or by bolt stays one to the other. The lower part and sides of the combustion chamber are also stayed. These boilers are constructed to carry pressures varying from 75 to 200 pounds per square inch. It may be asserted that of every 2 tons in weight of material in these marine boilers 1 ton is used solely for the purpose of staying weak parts and holding the whole structure together to withstand the pressure and resist irregular and avoidable strains due to expansion on account of imperfect circulation of water.

The Defects of Lancashire, Cornish and Marine Boilers.

The Lancashire and Cornish boilers, as land boilers, as well as the marine boiler just described, are used in all parts of the world. These boilers, in addition to their defective design and imperfect circulation of water relatively as to their power, occupy large space, and are expensive to construct. It is surprising that such a scientific association as the Manchester Steam Users' Association, England, should not only advocate the use of such boilers, but waste their engineering experience and ability in patching up and staying a construction which with the adoption of high pressures must very shortly pass into disuse. The intelligence and means of such an association will be employed to more advantage in designing and constructing a steam boiler than in experimenting to find out the weak points of an old and ill-designed contrivance for generating high-pressure steam. As to the marine boiler, which is another result of English practice, it is rather to be expected that the British Government will continue its use if for no other reason than that it is old. The low-pressure marine boiler, Figs. 18 and 19, was fashioned after the shape of Watt's wagon boiler, and the present marine boiler took in the profile of the Lancashire. It is natural that the British Government should be prejudiced in favor of such an old home-made idea, no matter what its defects.* This, however, cannot be any reason for the Govern-

* As giving an indication of the fascination which the double-weighted marine boiler has for some British engineers, it is only recently that a member of an English engineering and shipbuilding association proposed an additional shell. The idea suggested an external shell to stand 150 pounds pressure, which pressure was to be maintained between it and the inside shell, which was to carry a pressure of 250 pounds. The rest of the boiler, it was said, required very little change, except a few additional and larger stays. The pressure between the two shells was to be automatically controlled by pressure-regulating valves. The member did not state what might take place if the pressure-regulating valve did not work.

ment of the United States upholding such a prejudice by continuing the use of such boilers, when better boilers, capable of

The Locomotive Boiler.

In the locomotive boiler, Figs. 20 and 21, there is little, if any, provision for

door. The high temperature, due to the use of the exhaust blast, and the small water spaces tend to destroy circulation

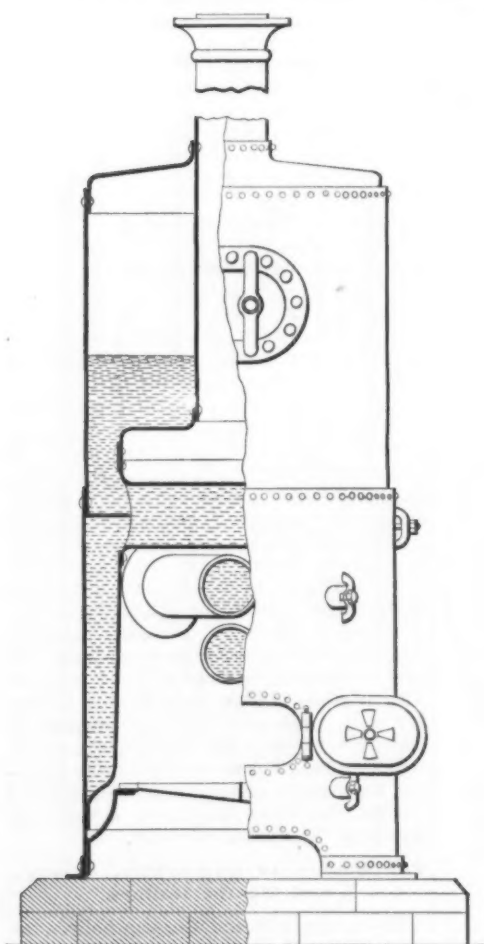


Fig. 26.—CrossTube Vertical Boiler—English Practice.

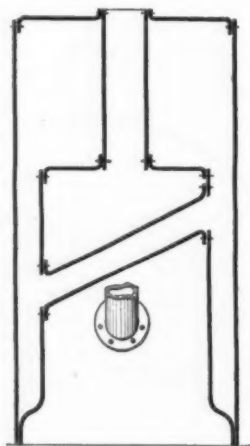


Fig. 27.—Vertical Boiler—English Practice.

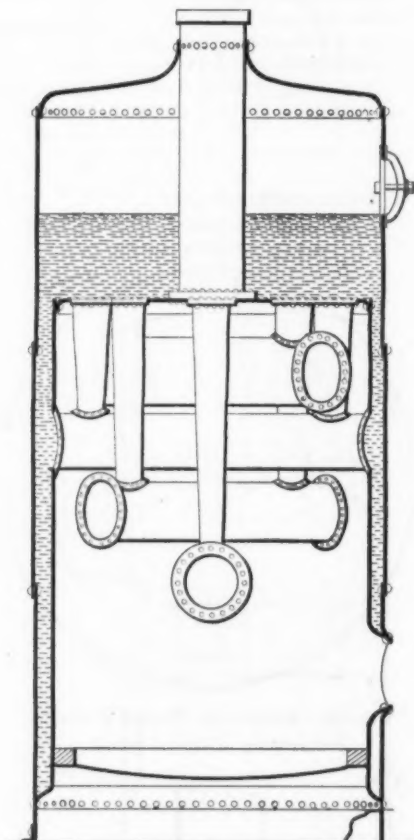


Fig. 28.—Wood's Universal Boiler, Staffordshire, England.

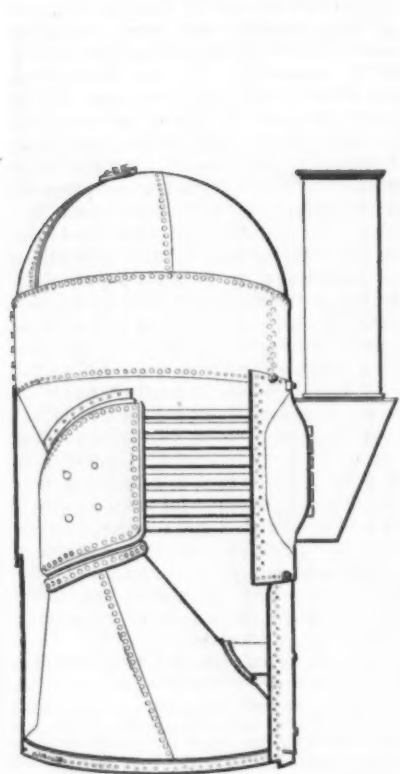


Fig. 29.—The Blake Boiler—English Practice.

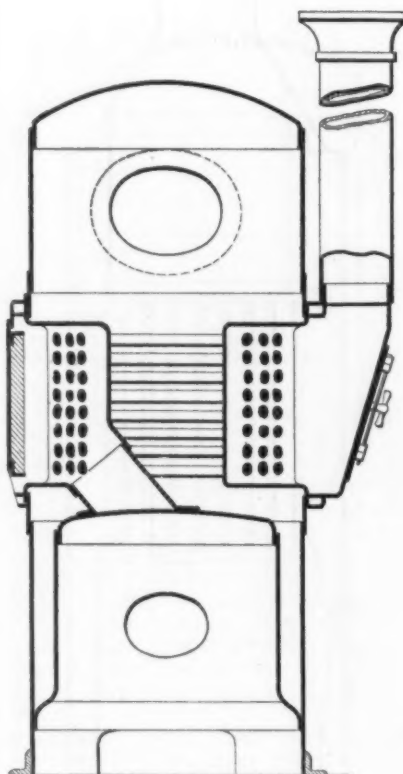


Fig. 30.—The Essex Vertical Boiler—English Practice.

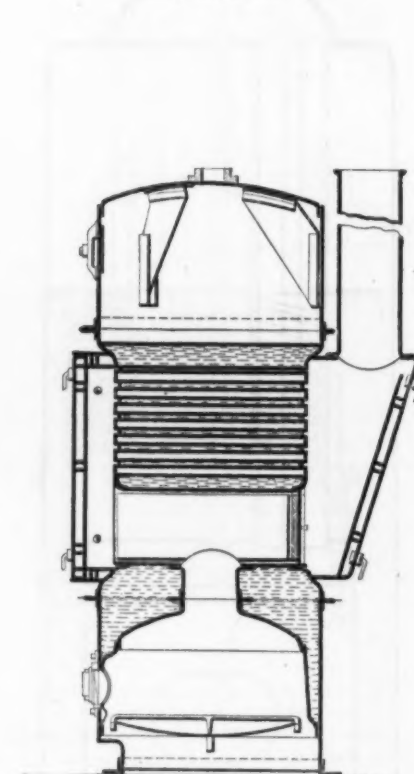


Fig. 31.—The Hyde Duplex Boiler—English Practice.

STEAM BOILERS.

carrying higher pressures, can be designed and constructed with half the weight of material.

circulation of water. There are possibly some descending currents in the water spaces at the front end near the firing

and all relative differences in temperature. The water takes up the heat partly by conduction. This statement is more or

less proved by the circumstance that the pressure is not reduced when pumping in water into a locomotive boiler when steam is not being taken from it. It may, therefore, be inferred that there are few, if any, currents and little motion in the water in the boiler when it is at rest. When steam is allowed to escape after the water has been injected, the reduction of pressure is much more than is due to the steam discharged, from which it is apparent that the withdrawal of steam tends to give a motion to the water in the boiler and agitate it against the heated surfaces.

The Multitubular Boiler.

The horizontal multitubular boiler, Figs. 8 and 9, with but few advantages as a steam producer, has had a general demand in the United States on account of its compactness, its lightness, ease of manufacture and repair. The circulation of water is not good. It will be seen by reference to Figs. 8 and 9, page 1073, that the heat is applied to the underside of the shell at one end. The ascending currents as they are produced pass up an irregular way between the tubes over the fire. The

diminishes, descends at the back, moving toward the front to displace the heated or ascending currents. This motion takes place with easy firing, but when the tem-

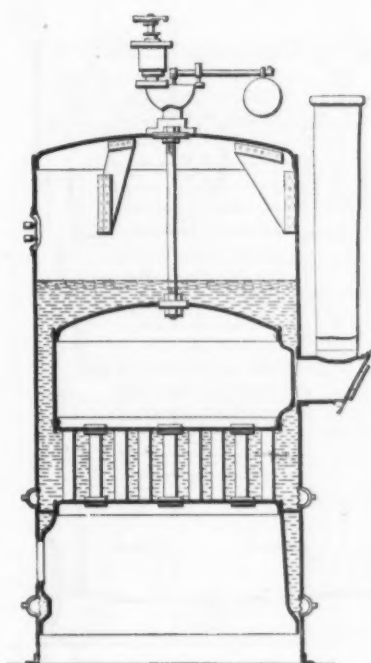


Fig. 32.—The Barlow Boiler—English Practice.

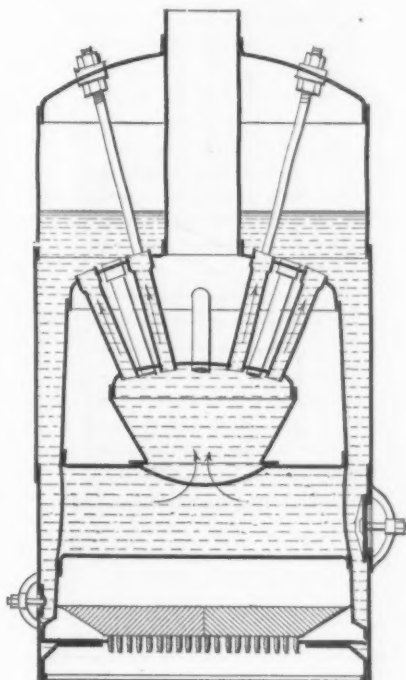


Fig. 34.—The "Erimus" Boiler—English Practice.

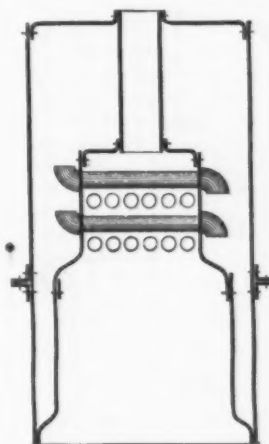


Fig. 33.—The Reading Boiler—English Practice.

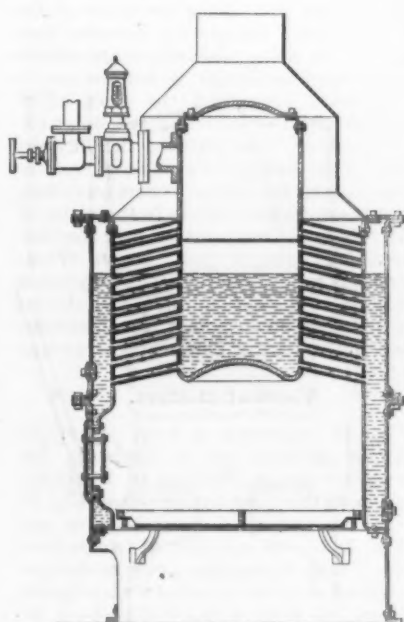
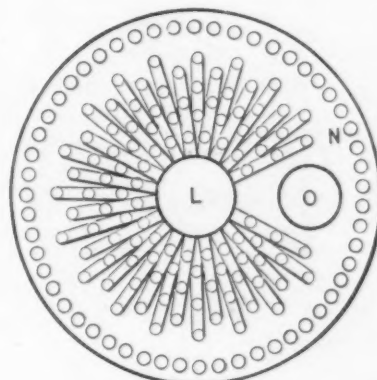


Fig. 35.—The Dion Bouton Boiler, Puteaux, France—French Practice.

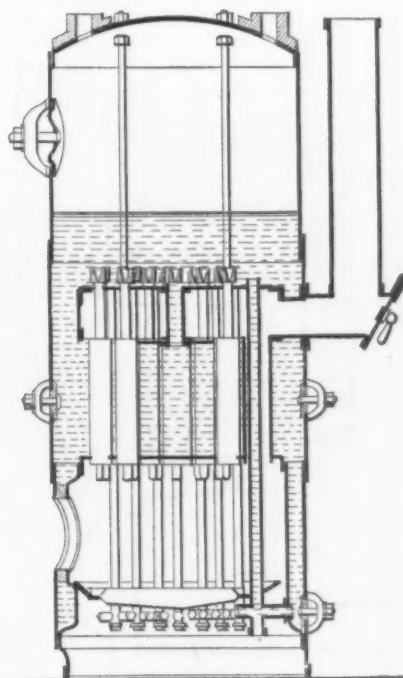
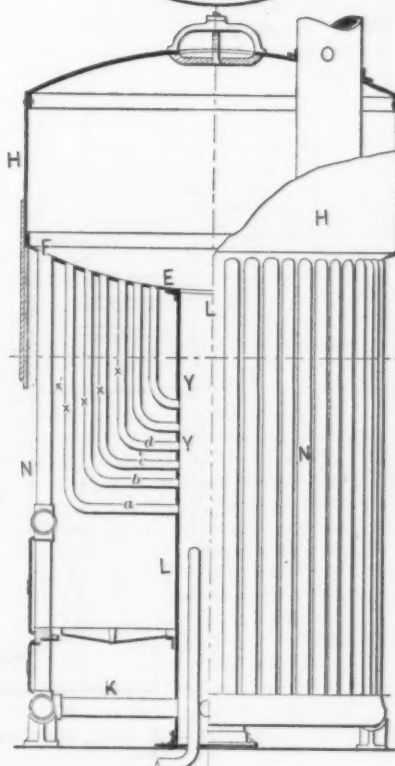


Fig. 36.—The "New Field" Boiler—English Practice.



Figs. 37-38.—Plan and Elevation of J. T. Smith Boiler, Baltimore, Md.

STEAM BOILERS.

On account of its compactness for the purposes for which it is intended, the form of the locomotive boiler tends to prevent any change in its design and construction, although such a change will include valuable improvements.

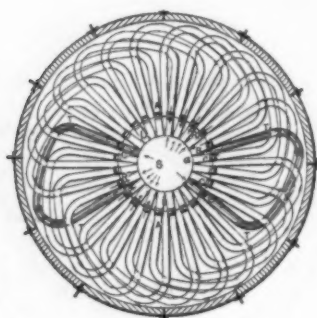
sides of the shell are exposed to the same action of the heat as the bottom, so that there is no opportunity for currents to descend on the shell sides. The heated water as it ascends to the surfaces passes toward the back, and, as its temperature

perature of the fire increases and the pressure is raised, circulation in this boiler degenerates into a struggle, steam lifts the water, and steam and water are thrown off together, and "priming" takes place. Efforts have been made to

improve the circulation by rearranging the tubes. Fig. 22 shows the tubes arranged in diagonal inclined rows. This is a way usual in a locomotive boiler. It is considered by some less weakening to the tube plates, and it tends to prevent those plates from bulging when exposed directly to the action of the fire, as in a locomotive fire box. This precaution is not, however, necessary in the multitubular boiler, and, in order to give vertical passages to the ascending currents, the tubes were arranged as shown in Fig. 8. To still further give freedom and space to the ascent of the heated water and steam globules, one row of tubes at the center is omitted, as shown in Fig. 23. It is claimed that the loss of surface of the withdrawn tubes is fully compensated for by the improvement due to circulation. The temperature of the front part of the bottom of the shell and the back part of the bottom of the shell relatively to the temperature of the top of the shell tends to create irregular strains on the rivets in the circular seams. The effect of this straining causes leaks and necessitates repairs, and leaves the boiler liable to rupture and even explosion. Such boilers cannot,

There are, however, some boilers of this class made with larger shells and having as large a diameter as 7 feet. Fig. 24 represents the form known as the multitubular vertical boiler. Fig. 25 shows an improvement in construction. It is known as the "submerged tube vertical boiler."

the larger sizes of the form shown in Fig. 24, some of the tubes are omitted out of the center. By this method of construction a large, deep central body of water is formed which is not easily put in motion and remains at relatively a lower temperature than the water near the tubes.



The Morrin Boiler, Brooklyn, N. Y.—
Fig. 39.—Plan.

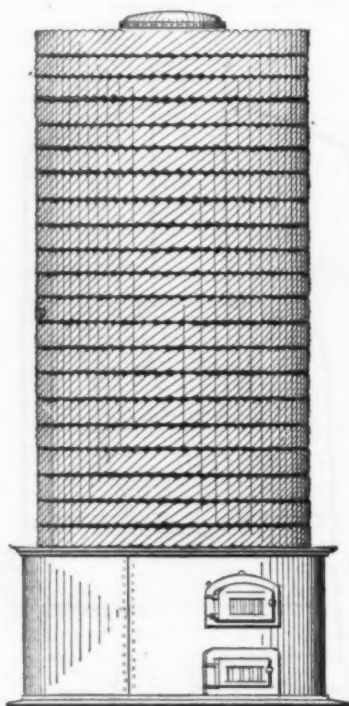


Fig. 40.—Elevation.

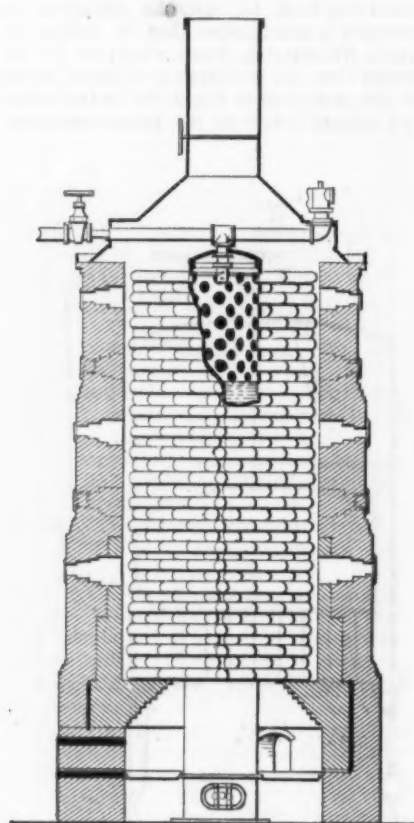


Fig. 41.—Hazleton Boiler, New York.

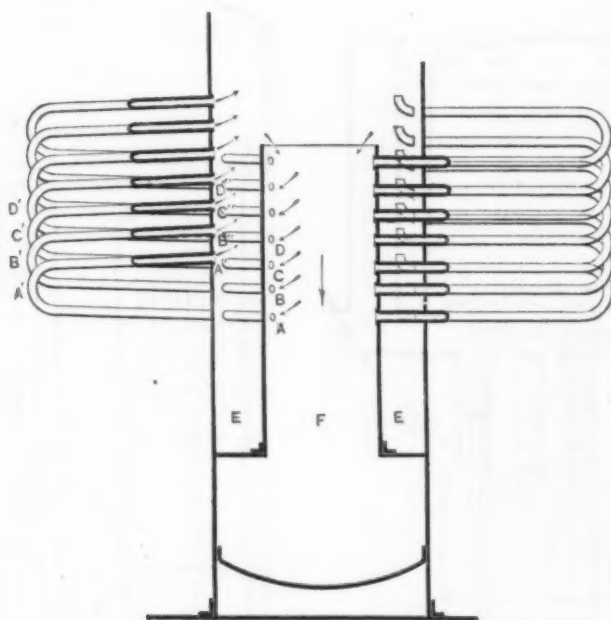


Fig. 42.—Diagram, Showing Circulation in Morrin Boiler.

STEAM BOILERS.

therefore, be operated with a forced fire, as quick firing produces more irregular strains and causes "priming."

The Vertical Multitubular Boiler.

The cylindrical vertical boiler is a form which is popular on account of its compactness, especially in small sizes with shells not exceeding 4 feet in diameter.

The object of this latter construction is to prevent the tubes from "corroding" and "pitting" at the water line. Circulation in these boilers has not had much consideration and their tendency to "priming" is known. The water space around the fire is usually narrow, and, as there is scarcely any circulation, sediment quickly accumulates. To improve circulation in

The highest temperatures at the tubes form ascending currents, while descending currents are found in the large central body of water and along the walls of the external shell. Circulation has also been improved by using relatively larger smoke tubes toward the center in comparison to the outward tubes, and the same effect can be attained by omitting the outer circle of tubes. The bulk of the heat by either of the last two methods is concentrated toward the center, where ascending currents are formed, while in the water of relatively lower temperature near the shell descending currents pass down. These alterations reduce the tendency to priming and improve the circulation above the fire box, but they do not affect the conditions found in the narrow water spaces around the fire.

Vertical Boilers.

Fig. 26 represents a form of vertical boiler in common use in England. Improvements in the direction of better circulation on this form are shown in Fig. 27 by the inclination of the cross tubes and in Fig. 28 by the addition of two vertical tubes to each cross tube. Several designs of vertical shell boilers exist with a variety of ideas for improving circulation or increasing the heating or absorbing surfaces. By the design shown in Fig. 12 increased surface was obtained, as well as rapid upward currents. To prevent the upward ascent of the discharge steam and water from each tube a cap is used so as to turn the discharge of the steam and water in a horizontal direction. With quick or forced firing the temperature at the horizontal part of the tubes where they are connected to the side of the fire box at Fig. 12 may be such as to produce two ascending currents, one up the tubes and

the other up the water space around the fire box, thus establishing equilibrium and destroying circulation. Figs. 29, 30, 31 and 32 are forms of vertical boilers in the design of which the principal object has apparently been to obtain additional heat absorbing surfaces without any particular gain in circulation. In forms shown in Figs. 33, 34, 35 and 36 attention has been given in these designs to improving circulation as well as obtaining additional heat absorbing surfaces. In the boiler design represented by Fig. 36 what are known as "drop" tubes are used. This tube consists of a vertical tube, the lower end of which is closed and the upper end open and connected to a horizontal tube plate. Within this tube is a pipe of smaller diameter, open at each end, extending to within nearly 1 inch of the closed bottom of the external tube. The top of the internal pipe is either level with the top of the external tube or above it at the point where the tube is connected to the tube plate. The surface of the external tube is exposed to the heat, which gives the water against its surface and surrounding the internal pipe a higher temperature than the water within the inner pipe. The water which first receives the higher temperature is moved upward by the water in the inner tube of relatively lower temperature and circulation is produced. The water which ascends to the top is discharged near the opening of the inner pipe and comes in contact with the water about to descend, to which it imparts some of its heat. As the fire increases in temperature the relative difference in temperature of the ascending and descending currents decreases, and so does the rapidity of circulation within the tubes. With continuous firing the circulation is liable to become intermittent and to stop sometimes. These tubes circulate with easy firing, but are not desirable for rapid or forced continuous firing when the water is not pure.

Vertical Water-Tube Boilers.

The more recent forms which vertical boilers have assumed are those which come under the title of vertical water-tube boilers. They are not inclosed by an external shell like the preceding class of boilers. The water and steam drums or shell may be said to be internal or partially so. Figs. 37 to 41 inclusive represent three kinds of developments in water-tube boilers. It will be observed that all three boilers have central vertical cylinders for steam and water. This cylinder in Fig. 38 is enlarged at the top, thus obtaining an increase in the water surface from which steam is given off. In the other two boilers the water surface to give off steam is small in comparison with that in boiler Figs. 37 and 38. To apparently make up this deficiency in water surface in boilers Figs. 39, 40 and 41, a quantity of heat-absorbing surface is used for converting into steam any water that may arise, as well as for drying the steam before leaving the boiler. Circulation in any of the three boilers cannot be called "free circulation," as intermingling and opposing currents are generally produced.

Circulation is produced in boiler Figs. 37 and 38 when the heat is applied to the tubes *a, b, c, d, &c.* The heated water passes from these level or horizontal tubes up *X X X* and to *Y Y*, the cold or heavy water displacing it in *a, b, c, d, &c.*, as best it can, crossing at *Y Y* heated currents from *a, b, c,* and cooling them as it enters *b, c, d, &c.* In the center of the cylinder *L* and in some of the tubes *N N* there will be some descending currents. When steam is produced and the fire forced it is probable that the water in the horizontal tubes *a, b, c, d, &c.*, will be pushed in opposite directions on the formation of steam in them. Ascending currents *Y Y* will be opposed by descend-

ing currents in *L*. Circulation in pipes *N N* will be indefinite, some having ascending currents, while others may have descending currents. The motion produced by this irregular circulation will tend to cause steam and water to be thrown off at the surface of the water, producing "priming."

In boiler Figs. 39 and 40 two circuits are arranged for the circulation of water. In the diagram, Fig. 42, it will be noticed that the circulation in the vertical cylinder causes the upward or ascending current to pass near the outside wall of the shell in the annular passage *E E*, and the descending currents in the inner cylinder *F*. The second circuit of circulation passes from the cylinder *F* through the bent pipes *A, B, C, D, &c.*, to the annular passage *E E*. The equilibrium between the two bodies of water *E E* and *F* is destroyed by the application of heat to the tubes *A, B, C, D, &c.* The heat taken up by the surface of the shell is small when compared to that absorbed by the surfaces of the tubes. It is only necessary to remark that it assists the ascending currents in passage *E E*. The temperature of the water in passage *E E* is raised by the heated water from tubes *A, B, C, D, &c.*; the water in these tubes is displaced by the water from the central body of water *F*. The water from the bent or circulating tubes as it enters the annular space *E E* varies apparently in temperature relatively—that is, the lower tubes are in contact with gases of a higher temperature than the upper tubes. This reduction of temperature in the gases is provided for partially by the increased temperature of the water toward the top of the space *F*, by which the upper tubes receive water at a higher temperature than the lower tubes. When the water in vertical cylinder and tubes is heated by the circulation described, globules of steam and water ascend to the surface, meeting currents of relatively lower temperatures, and this circulation continues until the temperature of the fire is increased. Steam is produced in each circulating tube when the fire is forced and carries to the surface of the water comparatively large globules of steam and water. It is quite possible that when the fire is forced water and steam are thrown above the surface of the water, because if it were possible to place elbows, as shown by dotted lines, Fig. 42, on the almost countless openings of the circulating tubes, the steam produced by the surface attached to these openings would be capable of lifting the body of water in the vertical cylinder several feet high. To meet what may be termed excessive ebullition a deflector is placed above the surface of the water. Several diaphragms are also used, which cause the steam and water to circulate through several tiers of tubes, during which circuit the steam is dried, and it is claimed, superheated. The design of this boiler is such that forcing the fire, forced circulation or excessive ebullition can apparently do no injury. The construction presents no parts that are liable to be subjected to irregular strains from sudden or unequal expansion. All the circulating passages are short and made with easy bends and the obstruction most apparent is the height of the superincumbent body of water in the vertical cylinder. Any steam produced in the circulating tubes is rapidly displaced by the head of water in the central apartment *F*, as there is comparatively no frictional resistance offered to the entry of the water into the tubes, which point accounts to a great extent for the economical consumption of fuel which is claimed for this design of boiler.

To assist in tracing out the course of circulation in boiler Fig. 41, its design should be understood. The boiler consists of a vertical cylinder, to the sides

of which numerous horizontal tubes are connected. These tubes are closed at the ends which are not attached to the cylinder. The head for circulation in the tubes is therefore equal to the diameter of the tube. When heat is applied each tube produces an independent circulation until the water in the tube is heated. The volume of water within the tube, when heated, expands into the water in the vertical cylinder, which it heats, and water of a relatively lower temperature from the vertical cylinder slowly displaces the heated water in the tubes. During this operation a great deal of intermingling of currents takes place, and globules of steam and water are formed and pass amid great confusion of currents to the surface of the water. When the temperature of the fire is increased, and the fire forced, steam forms in the tubes, and is spasmodically displaced by water, producing much irregular motion in the water in cylinder, and giving off convulsively steam and water at the surface. It must be admitted that the course of circulation in this boiler is more or less indefinite. There are other vertical water-tube boilers, but the principles of their designs do not vary much from the boilers to which reference has been made.

(To be continued.)

A Commercial Dictionary.

In his annual report to the Secretary of State, William E. Curtis, director of the Bureau of American Republics, refers to the progress made with a very important undertaking. We quote:

The recent International Conference recommended the publication of a code of nomenclature of articles of merchandise exported and imported, which has been undertaken under the direction of this bureau, and is now more than half completed. This will be a commercial dictionary, containing between 25,000 and 30,000 terms used to designate articles of commerce between the American republics, arranged alphabetically, with their equivalents in English, Spanish and Portuguese. Local terms used in the several countries to designate the same articles are inserted in smaller type in their proper place. At this writing the work has been carried to and including the letter "M," and the proof sheets have been read and corrected as far as the letter "H."

The necessity and value of this code can be fully realized only by those who have had actual experience in commerce with people speaking a different language and having their own peculiar terms to designate every article of trade; and it is frequently the case that the same term that is used to designate a particular article in one country is applied to an entirely different article in another. A merchant in South America who sends an order to a merchant or manufacturer in the United States naturally writes in his own language and uses the terms that are common to the country in which he lives. The manufacturer in the United States, being unfamiliar with that language, is unable to fill the order properly, and that fact has been the cause of serious misunderstanding, financial loss, and a great obstacle to the extension of trade. It is hoped, when the commercial dictionary is completed, to secure its adoption by the several American governments as an official guide in making out consular invoices and manifests, which will relieve merchants and manufacturers of serious inconvenience and embarrassment.

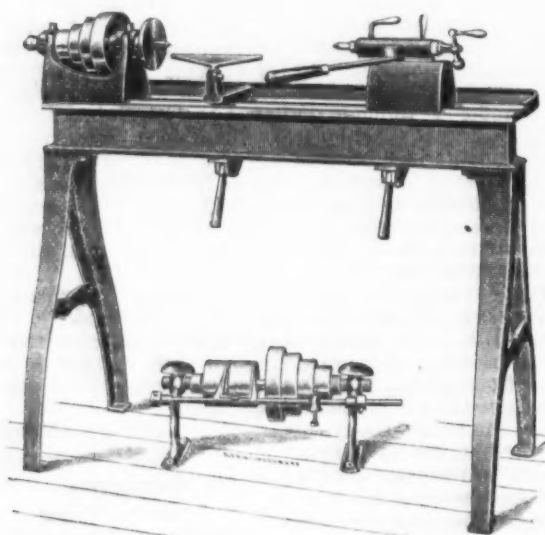
Upward of 1100 steamers navigate the Mississippi and Ohio rivers, and the freight carried on these rivers during the year by vessels of all classes comprised 31,000,000 tons.

The Wells Speed Lathe.

Wells Bros. & Co. of Greenfield, Mass., have recently placed on the market the speed lathe here illustrated. One of the most important features of the lathe is that the tail spindle is provided with both screw and lever feed, which allows the operator to cover a greater variety of work, and which will be found convenient and useful in many cases. The spindle is hol-

moved to the new extension which is about to be referred to.

For the new plant an iron building is being erected, an extension of the old mill, with two 87-foot spans 175 feet long. The plant to be placed in it has been very well laid out. It will be driven by a 36 x 48 Robinson Rea engine, equipped with a 25-ton fly wheel, to be run at 70 revolutions per minute. On the fly-wheel shaft will be a 7-foot 4-inch gear driving a



SPEED LATHE.

low. The general dimensions of the lathe are: Length of bed, 4 feet; length between centers, 26 inches; swing, 11 inches.

Tin Plate at Demmler.

During a recent visit to the works of the United States Iron and Tin Plate Mfg. Company at Demmler Station, McKeesport, Pa., we had occasion to satisfy ourselves positively that that pioneer concern in the American tin-plate industry is preparing for a large production. Under the guidance of W. C. Cronmeyer, the president of the company, we inspected improvements now under way. The works were originally started in August, 1874, were idle from November of that year to February, 1875, ran continuously until July, 1882, when the company were reorganized, but suffered from fire in February, 1883. The damage was, however, so vigorously overcome that the works were in full operation on May 15 of the same year. They have since then run steadily and are now being very considerably enlarged.

The mill consists of five single puddling furnaces, one scrap furnace, a charcoal forge, not now in operation, and two heating furnaces for the muck and sheet bar mill. The latter is a 20-inch mill, with the necessary equipment of squeezer and shears. In a line with the bar mill is a jobbing sheet mill, with 20-inch rolls, 30 inches wide, equipped with a double furnace and driven by a 500 horse-power engine. On the other side of this Robinson & Rea poppet valve engine is a 21 x 37 sheet mill, on which sheets up to 30 inches wide can be rolled. Then follows a cold-roll mill, with two sets of cold rolls, driven by the same engine.

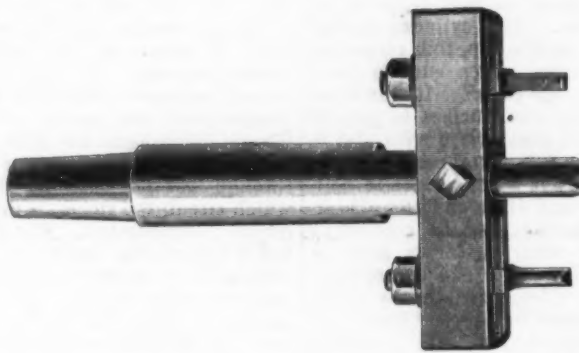
Next in line comes a tin mill, with 20-inch rolls, 30 inches wide, and one pair of cold rolls, which is operated by a Corliss engine for a short time used in a rolling mill at Fall River. Another engine of the same type drives two additional tin mills recently built in the place formerly occupied by a large sheet mill, which has been

14-foot 9-inch wheel, from which the trains on either side of the engine will be driven. These trains include two sets of cold rolls 18 inches in diameter and 26 inches wide, and two stands of finishing rolls 20 inches in diameter by 30 inches wide, with a set of roughing rolls between them. On the other side of the engine the sheet mill removed from the older part of the works will find its place. It consists of two stands of 22-inch rolls, 54 inches wide, and room has been reserved for cold rolls for large sizes. In fact, there is in contemplation the manufacture of tin plate 40 inches wide by 108 inches long. The new mill will be furnished with steam by a Heine boiler. Two of the

three of which were nearing completion at the time of our visit, while three others had progressed beyond the foundations. These stacks do not imitate the Welsh type, iron taking the place of a good deal of the masonry which is characteristic of the English practice. The stacks are placed side by side in two groups of three, one of these groups of three to be used for the manufacture of bright plate, while the other three will be employed forterne plates. It is the intention to put up six additional stacks as soon as it has been determined which is the most profitable way to run, the capacity of the rolling mills being large enough for 12. The important feature of the entire tin-plate establishment will be that no acid whatever will be allowed in the tin house. The plates will be first dipped into palm oil, then into metal, then go to the retinning or wash pot, and finally to the roller pot. The latter will be built according to designs made by Mr. Cronmeyer and his assistants as an improvement upon the Morewood patent, in which the size of the plates is limited by the depth of the pit. It is the intention of the management to continue to make a very heavy coating, as they have done for some time past when the old tinning stacks were still in use. The percentage adopted is 6 per cent. We understand that running double turn each stack has a capacity of 3 tons daily, making a product of 18 tons per day. Since the rolling mill has a capacity of about 1000 tons per month of light sheets, the aim will be to enlarge the tinning plant until about one-half of the entire output is placed on the market in the form of tin and terne plates. It is probable therefore that early in the new year the United States Iron and Tin Plate Works will be manufacturing tin plate on a pretty large scale.

The Hayes Tube-Sheet Cutter.

The tube-sheet cutter here illustrated, made by the Hayes Tool Company of Portland, Maine, will cut tube holes from 2½ to 6 inches in diameter. The knives have a tapering shank, which fits a corresponding taper in the cross arms. This taper fit, together with the shoulders clamping upon the bottom of the cross arms, makes the tool firm and rigid in any position. It can be easily and quickly ad-



THE HAYES TUBE-SHEET CUTTER.

old original tinning stacks of the mill have been demolished to make room for these improvements. The annealing is done in a series of five annealing furnaces, and the increased capacity of the mill will call for the building at an early date of three additional furnaces. The old pickling house has been taken away and a new wooden structure 56 x 60 feet has been nearly completed.

Beyond it lies what will be to many the most interesting part of the plant, a building which is to contain six tinning stacks,

justed exactly. The center is made of the best tool steel ¼ inch in diameter, and is fluted on the end. The main shank is purposely left large, in order that it may be turned to fit any taper.

A number of machinists and steel workers in the Cleveland Rolling Mills were discharged for disobeying an order prohibiting the use of intoxicating liquors while on duty. Evidence of being under the influence of liquor during the hours of work is also sufficient reason for discharge.

THE WEEK.

The value of corn as a substitute for wheat is being more truly estimated, as shown by the increasing demand for it in Europe. Chemical analyses conducted by the Agricultural Department show that while the water contained in corn is slightly less in proportion than in wheat, and the ash slightly less, and the crude carbo-hydrates but slightly more in proportion, the proportion of oil or fat is 5.2 per cent., against 2.16 per cent. in wheat; the proportion of albuminoids is 10.46 per cent. in corn, against 11.95 per cent. in wheat, and the proportion of digestible carbo hydrates 70.69 per cent., against 71.98 per cent. in wheat. In nutritive value, then, it cannot with any scientific reason be reckoned that corn is worth less than five-sixths of wheat, and yet its price for many years has ranged more nearly half that of wheat per bushel.

Of the Brazilian national debt about one-quarter is held in London.

The Brooklyn aldermen have voted to allow the introduction of the trolley electric system on all surface railroads. The equipment will cost about \$6,000,000.

Payments on the principal of the public debt of the United States have been indefinitely suspended, as a result of recent fiscal legislation. The margin of about \$3,000,000 in outstanding 4½ per cent bonds on which interest has ceased will gradually be reduced, but little progress can be made upon the principal of the \$25,364,500 in the new 2 per cent bonds and \$559,573,650 in the 4 per cents which remained outstanding on December 1. If the principal were to be wiped out at the maturity of the 4 per cents in 1907, nearly \$35,000,000 per year would have to be applied for every year from now to that time. There is no prospect that any such sum will be available for several years.

The agricultural products of Iowa for 1891 are valued at \$449,897,000, of which amount corn represents over \$100,000,000.

St. Louis merchants expect to be materially benefited by a new line of steamships from Mobile to Tampico, Mexico, to go into operation January 1.

George S. Coe, president of the American Exchange Bank of this city, who has long been good authority in monetary affairs, advocates the repeal of the silver law in a communication filling two pages of the *Forum*. Examining the legal-tender notes issued under the act of 1890, and considering in what they are to be redeemed, Mr. Coe finds that the holder "can get back only silver coins containing a uniform but much smaller amount of silver than the market value in bullion given for them, and therefore the notes are not redeemed at cost." And then he asks: "Is the currency so created a natural and intrinsically sound and healthful one, that invariably promotes the transmission and just distribution of values among the people, and certain to be redeemed under all circumstances at its full commercial equivalent?"

Receipts of merchandise by lake at Buffalo during the season just closed are the largest on record. Receipts of grain foot up 129,193,000 bushels, an amount 40,000,000 bushels larger than last year's and 24,000,000 bushels larger than those of 1880, which till now had made the record. Receipts of flour were 7,093,340 barrels, also beating the record; last season's were 6,245,580 barrels. Of lumber 262,729,000 feet were received, against 282,251,000 feet in 1890. Iron ore showed 419,890 tons, against 551,940 tons last year, which were the largest on record. Grain shipments by canal were 34,267,990 bushels, against 38,218,960 bushels last

season. In 1880, when the lake receipts were much smaller than this year's, the canal carried 71,690,260 bushels. The rail shipments of lake grain this year show a remarkable increase over any previous year. Coal shipments by lake aggregated 2,436,330 tons, against 2,157,810 tons in 1890 and 2,556,270 tons in 1888, the heaviest on record.

Boston merchants are associated in an effort to abolish the practice of dating bills ahead of time of shipment of merchandise.

The American Federation of Labor adopted a basis of agreement with the Knights of Labor, the special object being to avoid conflict in the issue of charters to trades unions and assemblies. It proposes to renew the struggle for an eight-hour day.

The frequent purchases by foreign syndicates of industrial establishments, iron mines, &c., in the United States, which have been announced from time to time in past months, begin to have their effect upon the gold movement between Europe and this country. This is the most natural explanation of the falling off in gold imports to the United States in the face of enormous exports of cotton and grain. The excess of exports over imports during the last four months is estimated at not less than \$140,000,000, indicating that a heavy balance must exist in favor of the United States, unless the payments abroad falling due on account of foreign investments in this country far exceed the common estimate. Besides the operations of syndicates above referred to, it is notorious that very large amounts of American securities are held in Europe, representing loans contracted for abroad by railroad corporations, not to speak of other securities issued by States, cities and miscellaneous corporations which are held abroad and make a formidable aggregate. In a rough calculation it is estimated that the interest and dividends falling due in the annual settlements approximate \$100,000,000, an amount that goes a long way to offset American exports of merchandise, especially if imports are only moderate, as at present.

The great wheat yield of Manitoba this season is stated officially in the bulletin just issued as 23,181,599 bushels, which, adding the yield of the Territories, will make 30,000,000 bushels of wheat alone for the great Canadian Northwest.

The low price of cotton bears hard upon banking interests in the South. The bank of Greenville, Miss., which suspended last week with \$500,000 liabilities, was the most wealthy in the State. The Hanover of New York is among the creditors.

The report again comes through London that the foreign fleet at Shanghai intends to seize the treaty ports on the Yang-tse-Kiang and appropriate the customs receipts as security. The proceeding, it is believed in well informed quarters, would aggravate the domestic crisis.

The Committee on Manufactures in the new House of Representatives, of which C. H. Page of Rhode Island is chairman, is liable to be charged with important duties. Intimation comes from Washington that it is the purpose of Speaker Crisp to prosecute special inquiries respecting the various industries, with reference to the necessity for further legislation. Prices, wages and the operation of the tariff are said to be embraced within the range of investigation.

A number of strikers who had been employed by a manufacturing company at Allentown, Pa., were convicted of unlawful assemblage and fined in sums varying from \$25 to \$35 and costs. One who was

unable to pay was sent to jail for 30 days, at his own request.

The winter fleet at Chicago numbers 287 vessels, including 100 steamers, and affords storage space equal to 5,000,000 bushels.

Old rails are used for telegraph poles in India. Two short pieces of rail are bolted to the foot of a long rail, and the ends are buried in the ground. The bracket is of wrought iron, with the ends turned up for the insulators. The cost is less than half of that of wooden posts.

The membership of the Massachusetts Institute of Technology now numbers upward of 1000, for the first time in its history. The courses include 104 in mechanical engineering.

Railway construction during the past year has been notably active in the Southern States and the aggregate for the entire country is 4168 miles. This increases the railway system of the United States to 171,000 miles.

Philadelphia, Baltimore, Boston and Newport News are all taking a good share of the grain trade. Philadelphia exports of grain in November exceeded \$9,000,000, showing a gain greater relatively than that of Baltimore. Exports from New Orleans increased at a still greater rate. The gain at Boston is less, both actually and proportionately.

The business of Canada has been greatly improved by the splendid harvest. Bank deposits are increasing at the rate of \$2,000,000 a month.

More than \$7,000,000 in gold has been received at San Francisco from Australia since August 1. A local paper there says San Francisco is becoming to the colonies what London has been to the Eastern States.

The port of Tampa, Florida, now has a population of 10,000 and is fast rising in importance. Plant's Hotel and grounds cost \$2,000,000.

The Pennsylvania Railroad navy makes a fleet of 236 vessels, many of which are in the car float service. Included are nine ferryboats and 31 steam tugs.

A notable sign indicative of the growth of the American Republic is the greater valuation of the exports of the United States in the month of October as compared with those of the United Kingdom for the same month. The valuation of British exports was \$102,400,000, showing an unusual decrease, while those from the United States were valued at \$102,900,000, an amount never before equaled in a single month. The peculiar features are that while United States exports consisted almost wholly of natural products, such as grain and cotton, British exports were chiefly products of manufacture. British trade, has suffered from troubles in South America, and the disturbance in China is believed to have some effect. Independent of special hindrances to British trade, enough is shown to augur the future commercial supremacy of the United States. The decrease in all metal products exported from Great Britain in October is no less than 21.5 per cent., but the decrease in products of iron and steel is 23.4 per cent., in machinery 9.8 per cent., in copper and manufactures thereof 18.8 per cent. and in hardware and cutlery 8.7 per cent.

It is said that merchants in the United States are now making unusual efforts to introduce their goods into Southern countries.

A new steamer building at Glasgow is expected to surpass in speed anything else afloat. She is 630 feet long.

The abandoned farms in New Hampshire, like those in other New England States, are being taken up since an effort

was made by the appointment of agricultural commissioners to secure purchasers. Of 1442 vacant farms reported last year, 300 were disposed of, and agricultural interests are receiving more attention than ever.

The disjointed remains of the Great Eastern have been distributed in various parts of the world. The plates went mostly to Canada and the beams and angles to Italian iron manufacturers. The old material brought about \$290,000.

An American visitor at the fortified town of Castries, in St. Lucia Island, British West Indies, inquires respecting the object of the powerful fortifications now in course of construction at that point. "Under the protection of the forts at the mouth of the harbor England has constructed a magnificent dry dock, capable of lifting all but her heaviest battle ships. She has established a coaling station and has built barracks for 1500 men, intending to bring hither all her West Indian forces excepting those posted at Kingston, Jamaica. There she holds 1800 men and seven large and powerful forts. An even larger force is maintained at Bermuda, where she has constructed the largest dry-dock beyond the borders of the United Kingdom, 381 feet long by 124 wide and 53 deep, easily capable of lifting the heaviest iron clad in her service. There, too, she has a perfectly appointed shipyard, another coaling station and harbor fortifications which, according to the official Colonial Yearbook, 'are mounted with the heaviest guns and render Bermuda quite beyond the reach of hostile attack.'" Apropos of the subject, negotiations are said to be in progress at Washington for the purchase of the Island of Guadeloupe, which offers rare advantages for a coaling station suited to the urgent requirements of the United States.

The Pennsylvania Railroad will be double tracked from New York to Chicago in time for the World's Fair.

The insufficient equipment of railroads as regards rolling stock, when the new crops began to come forward, is attributed not without reason to the hostile legislation of Western States. Railroad building almost ceased and improvements were suspended to such an extent in the effort to reduce expenses that farmers experienced difficulty as never before in forwarding their crops to market. A reversal of the blind policy adopted by the Alliance would have encouraged preparation for transportation while the harvest was yet in the future and avoided heavy losses.

The largest savings banks in New York and Brooklyn are losing their deposits, and, although the cause is not, clearly understood, the bank officers commonly attribute it to the growing disposition among the working classes to invest in building and loan associations and suburban lots. The decline in deposits is such that several of the important banks have no money to loan, as the law of this State allows savings institutions to invest not more than 65 per cent. of their deposits in bonds and mortgages. The savings banks consequently are investing in securities more easily available, but real estate dealers notice no effect on the rates for loans, as money is abundant. A statement issued by State Bank Superintendent Preston shows that there are 385 building and loan associations in this State alone. The statement shows further that about \$14,500,000 has been deposited in these institutions during the year 1890. The sum total invested by these concerns in bonds and mortgages during the same year was \$20,000,000.

Yellow fever in Brazil has taken a malignant form and foreign vessels suffer from the contagion.

Statistics of fruit shipments this year, which are now fairly complete, show that California has produced a more valuable crop of fruits and vegetables than in any previous year. Of oranges no less than 30,000,000 pounds were shipped, while the total shipments of other green fruits amounted to 78,000,000 pounds. Dried fruit shipments reached the enormous figures of 72,000,000 pounds. Raisins furnished 47,000,000 pounds, against 37,000,000 last year. Of canned goods this year's shipments were 78,000,000 pounds, against 49,000,000 last year. In everything except wine and salmon there has been great increase in shipments, showing that the year is one of the most successful ever known for farmer and fruit grower.

Californians are making good progress in securing subscriptions for a steamship line to New York via Cape Horn.

Respecting free silver coinage Senator Carlisle sensibly observes: "I do not think the majority of the business people of the United States are in favor of further legislative interference with the currency at this time, and some of the propositions suggested are full of danger to the country. The free coinage of the American product of silver, as proposed by some, would certainly be worse for the people generally in one respect at least than any plan yet adopted, as that would donate all the difference between the bullion value and the coinage value of the metal to the owners of mines and speculators in mining stocks instead of to the Government, making them a present, in fact, from the people of the United States of a great many million dollars every year. From February 28, 1878, the date of the resumption of the coinage of the silver dollar, to June 30, 1891, this difference amounted to nearly \$72,000,000, which has gone into the Treasury to the credit of the taxpayers of the country. Of course, if the Government receives bullion from the owner, coins it free of charge and gives him back a stamped dollar for every 371 grains of pure silver, the bullion owner will receive a very large sum over and above the commercial value of his product in the markets of the world."

The coal miners' strike in Indiana, which was recently declared off, is estimated to have cost \$1,750,000, of which one-half represents miners' wages. The miners, through their leaders, affirm that the interests of all concerned are identical and can be best promoted by harmony.

After eight months' labor since starting the headings over 2400 feet have been excavated through solid rock at the Niagara tunnel.

The glut of cotton will be a special subject before the Southern State Agricultural Commissioners, who meet at Memphis, January 8. It is claimed that at 7½ cents per pound cotton does not pay the planter. Last year at this time the price was 8½ cents, and during the panic, or depression, rather, it only dropped to 8¼ cents.

President Gompers intends to spring the eight-hour question at the most fitting opportunity. He will act advisedly, so as not to repeat the mistake that occurred among the bituminous coal miners. The trade to initiate the proposed general movement has not yet been selected.

The United States Government will be congratulated if it avoids a war with Chili. The provocation has been great, and the national honor must be vindicated, but it is one of the acts of diplomacy to fire guns loaded with paper and satisfy every demand without either bloodshed or expense. Political complications aside, the United States have reason to desire only the highest prosperity for Chili and its largest commercial development.

The Meneely Tubular Bearing.

An important article of railroad equipment now being manufactured by the Meneely Bearing Company of West Troy, N. Y., is something which the rapid transit of the day demands, both for economical reasons and those of safe transportation. Such excessive stress is placed upon motive power by the present great weight and speed of trains that a reliable power-saving journal bearing has become a necessity. The invention in question is the Meneely tubular bearing. It forms a substitute for the existing "brass" and oil box, which, almost unimproved, have formed the bearings for whirling wheels for over half a century. Its use does away with the "hot box," a frequent occurrence on railroads, and which is often the cause of dangerous delays and even of direct accident. It reduces the cost and labor of frequent oiling.

The Meneely tubular bearing is based upon the rolling as distinguished from the sliding principle, and effects its purpose, broadly speaking, through the exclusion of sliding friction. As steel tubes of requisite strength for such severe and exacting service have not heretofore been demanded in the arts, the company were forced to solve the difficult question of their production. The rollers used in the Meneely bearing are manufactured under a new process from specially prepared steel. They possess great strength and uniformity, and cannot be fractured by parallel pressure. The tubular bearing is composed of these tubes grouped closely, though not in contact with each other, about and in alignment with the journal and inclosed in a steel-lined cylindrical housing. The arrangement of these tubes is longitudinal, and they are in three series, the central series being of double length. Every center tube overlaps the adjacent end tubes.

Through the alternating, opposite concavities thus formed by the interior of the tubes, strong rods of steel are passed, which lock the rollers in fixed position respecting each other and are themselves reciprocally held by the rollers. In connection with the intermeshed tubular rollers, the full length and unimpeded rotation of the separators form a double safeguard against the wedging of the journal and also spreading of the rollers from either weight or wear.

The "thrust" or lateral movement of the axle is provided against by receiving its impact upon a steel ball seated in a groove formed in the steel cylinder head and a corresponding recess formed at the end of the journal. Every movement of the journal is thus controlled by rolling appliances.

The new bearing is not only provided for railroad cars, but for the electric motor cars. An official gravity test, made with two railway passenger cars of like weight upon a down grade from the foot of which the track was slightly up grade, showed that the car provided with Meneely roller bearings ran 534 feet from the foot of the grade before stopping, while the other, provided with ordinary bearings, ran just 100 feet.

The cars of the Albany Railway have been operated upon Meneely bearings since the opening of the road in April, 1890, and the ten large and handsome cars which will shortly be added to its rolling stock are to be equipped with improved tubular bearings. The new motor cars of the Troy and Lansingburgh Railway are also furnished with the same device. One of the Delaware and Hudson Canal Company's passenger coaches has been operated with great success upon tubular bearings for more than a year, and a trial car equipment is being placed upon the Boston and Albany Railroad.

The Iron Age

New York, Thursday, December 31, 1891.

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The Business Outlook.

The conviction is rapidly gaining ground in business circles that the near future will bring with it a very notable improvement in trade throughout the greater part of the country. When in August and September it became certain that this country would be blessed with exceptional crops, a feeling of buoyancy developed, which, however, soon gave way to a depression keenly disappointing to manufacturers and traders. Buying on the part of consumers remained very conservative and capital adhered to a cautious policy. The business community was then sorely puzzled to account for the failure to realize expectations. It is pretty clear now that a good deal of the wreckage of the hard times had not been cleared away and that many financial, commercial and railroad enterprises had run deeply into debt. In other words, we were hit very much harder in the financial flurry of November, 1890, and the subsequent period of uncertainty, than the business community had any idea of. The first step has been to make repairs, and that work, being slow, is still in progress.

A very similar state of affairs held good with our great agricultural interest. Our farmers did not, as was expected, promptly expend their crop money in equipping their homes and their holdings, but have been paying off mortgages and wiping out debts. It is stated by those who are in charge of some of the largest farm mortgage institutions that obligations of this character are being met at an unprecedented rate. Contrary to expectations, therefore, the stimulus will not come through the purchasing of the agricultural community, but seems destined to proceed through the desire of idle capital to find remunerative employment. Naturally, the stock exchanges, under these circumstances, will be the first to attract attention, and it seems that such a movement has already begun. Interest in speculative operations has kept up during the holidays at a rate never known before at this particular period.

Our foreign commerce is already showing in the most marked manner the influence of large shipments of grain. For the 12 months ending November 30, 1891, the exports and imports of merchandise compared as follows with the records of former years:

Exports and Imports of Merchandise.

	Exports.	Imports.
1891.....	\$949,022,185	\$819,372,489
1890.....	855,932,130	822,493,809
1889.....	815,162,597	771,210,445
1888.....	679,233,011	710,935,705
1887.....	727,483,817	712,985,352
1886.....	72,260,413	659,362,607

The excess of imports is therefore apparently very large. As a matter of fact, however, the money paid for the goods imported is considerably larger, because they are entered at the market valuation at the foreign point of production. Then, too, the machinery for the collection of export statistics to border countries is so defective that only a part of the value of the goods sent to Mexico and Canada is entered. Still, the enormous increase in the exports tells its own story. The excess of imports over exports, or *vice versa*, of merchandise for a series of months may be instructive in this connection:

	Exports.	Excess of Imports.
1890.		
January.....	11,988,706	
February.....	7,218,345	
March.....	5,455,415	
April.....		8,378,825
May.....		12,681,412
June.....		22,323,592
July.....		29,114,477
August.....		5,011,085
September.....		7,246,606
October.....	25,778,367	
November.....	24,770,569	
December.....	37,649,421	
1891.		
January.....	30,329,328	
February.....	8,896,748	
March.....		2,320,510
April.....		10,368,130
May.....		13,931,516
June.....		15,867,491
July.....		4,373,142
August.....	6,733,030	
September.....	21,349,038	
October.....	36,041,319	
November.....	45,511,601	
Totals.....	12 months, 129,649,696	
	11 months, 92,000,275	
	5 months, 105,261,846	

It will be noted that the last three months show a very large excess of exports, reflecting the heavy grain movement. It may be worthy of note that the percentage of dutiable merchandise imported during the twelve months ending November 30, 1891, is very much smaller than it was a year before. Out of the total of \$819,372,489 for 1891, only \$405,033,659 was dutiable, or 49.4 per cent. For the like period a year before the figures are \$535,794,748 out of a total of \$822,493,809, or 65.1 per cent.

The specie movement for the last 24 months is of interest. We tabulate below the monthly excess.

	Gold.		Silver.	
	Excess of		Excess of	
	Exports.	Imports.	Exports.	Imports.
1890.	Dollars.	Dollars.	Dollars.	Dollars.
Dec.....		991,930	2,265,066	
1890.				
Jan.....		598,868	1,684,112	
Feb.....		305,743	1,225,221	
March.....		165,608	1,939,651	
April.....	574,002		1,085,314	
May.....	7,718		2,181,800	
June.....	3,345,530		874,475	
July.....	10,664,975		1,516,309	
Aug.....	411,288		148,180	
Sept.....	1,144,005		204,897	
Oct.....	2,196,403		2,071,705	
Nov.....	1,359,249		487,136	
Dec.....	5,400,659		949,860	
1891.				
Jan.....		669,672	290,811	
Feb.....	3,444,842		646,073	
March.....	4,541,600		1,021,572	
April.....	13,929,798		1,261,605	
May.....	30,363,112		423,594	
June.....	15,539,494		523,847	
July.....	5,633,520		244,408	
Aug.....		1,222,587	1,488,715	
Sept.....		7,106,138	953,168	
Oct.....		16,088,352	801,471	
Nov.....		8,489,768	2,411,194	
Totals:				
12 mos.....	34,480,162		9,682,371	
11 mos.....	30,890,821		8,739,511	
5 mos.....	27,273,319		5,410,146	

Figuring the merchandise and specie movement we find a balance in our favor of \$85,380,173 in the 12 months up to December 1 this year as compared with \$19,787,738 for the corresponding period last year. It is impossible to say how much of this has been paid for in American securities which have crossed the Atlantic, passing into the hands of American bankers, speculators and investors. The quantity is certainly large, competent judges placing it at as much as \$100,000,000.

And yet the whole of the foreign trade is small compared with the volume of our domestic business, which must be quickened in nearly every department by the prosperity of our agricultural producers.

So far as the iron and steel and allied trades are concerned, we have in the past pointed out that the keynote in the situation lies in the condition of the rail trade, which is in a fair condition only as far as the volume of business is concerned. A good deal of misapprehension has grown out of the announcement made by *The Iron Age* of the sales of rails for 1892 delivery. The quantity is not exceptionally large. It is really only normal. But it is a very great improvement over last year, and to that extent justifies hopeful views concerning the future. One thing, however, must be considered. Western producers of Bessemer steel of all grades are not likely to give expression to roseate views before the season's ore negotiations are closed. On the contrary, they are likely to handle their sales carefully, beyond the quantities covered by present stocks of ore, and if they do sell more than that will naturally keep the fact pretty quiet.

Iron manufacturers East and West have, during the past two weeks, expressed their views freely to us. We may say that they are practically unanimous in believing that a moderate improvement in prices is imminent, but they are to a man exceedingly conservative. They do not believe that a marked advance is probable, a view which is not, however, shared by some merchants of long experience and excellent facilities for gauging the future of the market. Undaunted by the experience of the past few months, and by the fact that the production is enormous, a sanguine minority among merchants predict a sudden and marked rise before the spring.

Deep Water Canals.

There is something like a reaction in public sentiment in favor of transportation by water routes, and this change is confined to no single continent. In Europe as in America we hear much of ship canals, sometimes to bisect an isthmus, but more frequently to provide transportation between the seaboard and cities lying inland, with the object of making interior seaports, so to speak. The Russian ship canal to provide a retreat for war vessels from Cronstadt in the direction of St. Petersburg was the first modern scheme of this character to engage attention. It is nearly 30 miles in length, 21 feet deep, and

was completed in 1885 at a cost of \$5,000,000. The Manchester ship canal, which is being pushed toward completion under great fiscal and engineering difficulties, is a later example, and the canal across the Isthmus of Corinth is another. The ship canal from Paris to Rouen is to be about 114 miles in length and 23 feet in depth, and the estimated cost is \$30,000,000. In no way discouraged by the disastrous failure of M. de Lesseps at the Isthmus of Panama, the projectors of the Nicaragua Canal are confident of attaining a complete success. Then there is the Hennepin Canal job for connecting Lake Michigan with the Mississippi; another scheme contemplates joining Lake Superior with the Mississippi, and still another would connect Lake Erie with the headwaters of the Ohio River. The last mentioned has a strong support among the active and enterprising men identified with the glass, coke, coal and iron and steel industries in Pennsylvania, Ohio and West Virginia, and these interests are united in pushing through Congress a bill providing for the survey of the proposed route. The general idea in all these schemes is to facilitate the movement by the cheapest means of transportation of an enormous volume of coarse, heavy freight between central points in the interior, thereby promoting the highest development of national resources.

Of all the plans for opening interior waterways so as to admit the passage of deeply-laden vessels to the sea, it may be doubted whether any others share so largely in public favor as that for deepening the connecting channel of the great chain of lakes. The memorial to Congress adopted by the recent convention at Detroit contemplates the excavation of a 20-foot channel along the whole line, so that large vessels may pass direct from Duluth to a transatlantic port. This gigantic enterprise is the natural sequence of the unparalleled development of the mineral regions of Lake Superior in conjunction with the agricultural expansion of the great Northwest, revolutionizing the entire interior carrying trade. Within a brief period steel steamship propellers and barges of the largest capacity have come into vogue, until the ton mileage of the lake traffic bears some comparison with the aggregate of all the railways of the United States. These ships now seek an outlet in the broad Atlantic. In short, the system of public works inaugurated in the Dominion must be duplicated on this side of the national boundary, not of the same limited dimensions, but on a scale commensurate with a traffic already stupendous, though yet in its beginning. Respecting the probable cost of a 20-foot channel from Chicago to Duluth or Buffalo, it must be conceded that the United States engineer's estimate of about \$3,500,000 is extremely modest, especially when contrasted with that of the Welland Canal, which amounted to \$24,000,000. Spurred up to new efforts in the endeavor to keep step with the march of events, the Dominion Government has just decided to enlarge the "Soo" Canal,

increasing the lock to admit the largest craft in the lakes, three at a time, and engineers advocate a second Welland system.

Among New York merchants and forwarders at the present time feeling is warming up in favor of a ship canal to Philadelphia and the scheme will presently come before the Board of Trade and Transportation for discussion. The prediction is made that an investment of \$12,000,000 for this purpose would pay from the start.

Modern Rolling-Mill Practice.

The enormous amount of work done in the reconstruction and enlargement of rolling-mill plant, and the numerous new mills built during the past few years have given exceptional opportunities to American designers. Careful study has been given in general arrangement of the plant to the easy handling of materials, to the making of repairs and to the comfort of the men. In rolling-mill work the overhead traveling crane to sweep the entire floor area is gaining in favor, with the modern electric cranes evident favorites. The conveying of stock and product by driven rollers, either at mill level or elevated, is finding more and more extended use. In Bessemer work, the pit with its concentration of work is beginning to give way to the casting on cars, which are stripped and handled inside of the converting department. Modern practice has pronounced decidedly in favor of keeping the ingot in an upright position until it reaches the blooming-mill table. Vertical strippers and pit heating furnaces are becoming the standard equipment. In open-hearth practice the design of the furnaces has been very considerably improved, and in some instances they are being so arranged that the roof can be taken off bodily by a traveling crane.

In heavy rolling-mill work the aim is to avoid intermediate heating, so that the finished article is produced direct from the ingot in one heat. At the new Homestead Mill, now partly completed, the ingot is clogged and at once rolled down to large beams in one heat. Another achievement in the same direction is the rolling, at Duquesne, direct from the ingot in one heat of one and one-half billets, one-half the product being delivered as 4-inch billets. We have been recently shown the plans of a leading engineering and building firm of Pittsburgh for doing the same work on a very powerful reversing mill. We have called attention recently to the simultaneous rolling of several rails in the intermediate train at Edgar Thomson, a system which seems capable of further extension. At one rolling mill where the work calls for frequent changing of rolls the whole stand is carried off bodily by overhead traveling cranes, so that the changing can be done in about an hour. Designers of plant do not hesitate for a moment at making arrangements which call for the handling of large masses. An interesting instance of the readiness with which mechanical means are adopted is furnished by a feature of a plate mill now under construction. The principle of al-

lowing the plate to cool and have it inspected on a long table between the mill and the shears has been adopted. As hitherto designed the cooling table admits of the inspection of only one side of the plate. In the design referred to it is to be picked up bodily and turned over, to allow of the proper examination of its surface.

In every direction the effort is being successfully made to so design plant that it will admit of continuous work with enormous output, with mechanical appliances to reduce labor to a minimum, and general arrangements to increase the efficiency of labor and facilitate repairs.

OBITUARY.

JEROME I. CASE.

Jerome I. Case, one of the most prominent men in the world in the manufacture of agricultural implements, died at Racine, Wis., on the 22d inst., after a lingering illness, at the ripe age of 73. Several years ago he was stricken with diabetes, and while conscious that his disease was incurable fought against it with all the pluck of his nature. He was born in Oswego County, N. Y., December 11, 1818, and was the youngest of four brothers. His father was a poor man and having a family to take care of bought the right to use and sell a one-horse tread-power threshing machine and Jerome was given charge of it. The boy kept close to his work until of age, and, as a consequence, his education was neglected, yet he had acquired about as much as the country schools of the time could furnish. He had been frugal and when 21 had money sufficient to purchase a scholarship in the Academy of Mexicoville, N. Y. He then left his father and became manager of a threshing machine in his own behalf. Soon afterward he purchased six one-horse tread power machines and started West. Arriving at Racine he sought buyers for his machines and sold them. In 1848 he had produced an improvement over the old machine which sold readily, and four years later he had a shop of his own in Racine. The vast establishment he has left behind him, now known as the J. I. Case Threshing Machine Company, is a monument to his business capacity and his mechanical ability.

When he started to manufacture machines himself he met with some reverses, but surmounted them all by his firm will, and from a small shop in which he turned out one machine a day, he saw his establishment grow into the largest of its kind in the world, covering almost 12 acres of ground. It was Mr. Case whose inventive genius first gave to the world the appliance by which the grain was separated from the chaff in threshing without a process of winnowing afterward. From this invention his great fortune grew.

Every portion of the works is in the hands of tested and trusted employees, and the policy of Mr. Case in the enlargement of the works and in the addition of principals whose interests were entirely with the business, was to recognize the merits of others who had been instrumental in advancing his enterprises. In 1890 the manufacturing capacity of the plant was \$2,000,000 per annum. The buildings connected with the works form a village in themselves, including the residences of the workmen, who, with their families, form one-sixth of the population of Racine.

Mr. Case was one of the founders of the J. I. Case Plow Works, whose affairs, when he determined their necessities, fell into his hands, and under his management

they had been since 1884 an eminent success.

Hundreds of incidents in the life of Mr. Case might be written and still the half not be told of his large-heartedness, force of character and business capacity. His property relations spread almost across the continent.

ALBERT TOWER.

For the past year Albert Tower of Poughkeepsie has not been in his accustomed health. Last fall he went to Europe and spent most of his time in Denmark, hoping that his health would be benefited. He returned little if any better than when he left, and died December 24. He was born in Ohio, and came to Poughkeepsie something over 40 years ago. In 1850 he became superintendent of the Poughkeepsie Iron Works Company, who were reorganized in 1875 as the Poughkeepsie Iron Company, with Mr. Tower as president. Mr. Tower had lately given up the active business management of the works and mines in the country to his sons Edward and Joseph Tower. He was also interested in Lake Superior iron mines in the neighborhood of Tower, Minn.

DAVID SPAULDING,

one of the pioneer nail manufacturers of the Ohio Valley, died at his residence in Steubenville, Ohio, last week, aged 82 years. Mr. Spaulding was a native of Sandwich, Mass., where he learned his trade. He came to Pittsburgh in 1832 and worked at his trade in that city until 1854, when he removed to Wheeling, W. Va., where he became a member of the firm of Bailey, Woodward, Spaulding & Co. The firm purchased the La Belle Iron Works, and five years later the members of the same company purchased the Jefferson Iron Works of Steubenville, Ohio, under the name of Spaulding, Woodward & Co. Mr. Spaulding retained his interest in both companies for 25 years, during the greater portion of which time he was president of both concerns. In 1884 he sold his interest in the iron companies and made large investments in Southern iron lands and incorporated the Spaulding Iron Works at Brilliant, Ohio.

GEORGE BRYAN STERRITT.

George Bryan Sterritt, for some years a member of the firm of Lindsay, Sterritt & Co., dealers in hardware, Pittsburgh, Pa., died suddenly in New York City on the 22d inst. Mr. Sterritt was 48 years old, and was one of the best known business men in Pittsburgh.

Rapid-Fire Gun.—A machine gun was tested at New Haven a few days ago, by the Winchester Repeating Arms Company, that fired 900 shots in one minute. The only gun approaching this rapidity of firing is the Maxim machine gun, with a record of 750 shots a minute. The new Winchester gun has a water jacket surrounding the barrel, which holds 1 gallon of water. That amount of water is evaporated in one minute when the gun is in operation. In experiments made without the water jacket the barrel would become too hot for safety in less than half a minute. The breech mechanism is operated by a crank connected with a system of multiplying gears, by means of which the rapidity of motion is obtained. The ammunition is fed into the breech from a continuous web belt holding the cartridges in pockets. The exploded shells, as they are thrown from the breech, rise about 2 feet over the gun, and fall in what appears to be a gracefully-curved bar of burnished brass. The gun is the invention of the Browning Brothers, gun makers in Ogden, Utah. The model experimented with is of 0.45 caliber.

The Cost of Tin Plate.

We present below a table giving in detail the crew and the wages paid in the manufacture of tin plate in Wales for a works turning out 2000 boxes per week, being the make of four mills, each producing 500 boxes per week. English money has been converted into ours on the basis of \$4.85 to the pound sterling:

Wages and Number Employed in Tin-Plate Manufacture.

Girls.	Boys.	Men.		Per week.	Total.	Grand total.
			Cutting iron and delivered to foreman.	\$4.36	\$8.72	
			Roller men	10.00	121.08	
			Doublers	8.29	99.48	
			Heaters	7.11	85.34	
			Catchers	5.02	6.24	
			Shearers and helpers.	15.07	62.28	
			Openers	1.70	20.40	
			Boys bundling shearings	1.70	10.20	\$467.72
			<i>First Pickling or Black Pickling.</i>			
			Pickler in charge	7.17	7.17	
			Boys filling cradle	2.18	6.54	
			Girls swilling and scouring	2.18	15.36	28.96
			<i>First Annealing or Black Annealing.</i>			
			Annealer in charge	9.70	9.70	
			Helpers	5.00	20.36	30.06
			<i>Cold Rolling.</i>			
			Man in charge	5.82	5.82	
			Boys Rolling	2.18	8.72	
			Boys catching	1.94	7.76	
			Boys greasing	1.94	3.88	
			Man wheeling plates and weighing	4.61	4.61	30.79
			<i>Second Annealing.</i>			
			Annealer in charge	7.17	7.17	
			Helpers	5.00	15.27	22.44
			<i>Second Pickling.</i>			
			Pickler in charge	7.17	7.17	
			Boys filling cradle	2.18	6.54	
			Girls swilling and scouring plates	2.18	15.36	28.97
			<i>Tinning and Washing.</i>			
			Tinners	10.00	121.08	
			Washmen	10.09	121.08	
			Grease boys	3.30	40.32	
			Girls branning and dusting	1.81	65.16	
			Man wheeling plates and coal	4.30	4.36	
			Man lighting fires by night	4.30	4.36	356.36
			<i>Sorting Room.</i>			
			Sorters	8.72	26.16	
			Girls reckoning plates	2.18	3.36	
			Men boxing plates	4.85	9.70	40.22
			<i>General Charges.</i>			
			Roll turner in charge mills and cold rolls	14.55	14.55	
			Tin house foreman charge pickling and annealing	12.12	12.12	
			Engineers in charge of mill engines	7.17	14.34	
			Firemen	4.85	9.70	
			Blacksmith	7.17	7.17	
			Helper	4.30	4.36	
			Bricklayer	7.17	7.17	
			Helper	4.30	4.36	
			Driver small engine	3.50	3.50	
			Millwright in charge of machinery	12.12	12.12	
			Carpenter	5.82	5.84	
			Laborers, all departments	4.30	21.80	117.10
			<i>Office Department.</i>			
			Superintendent	24.25	24.25	
			Bookkeeper	9.70	9.70	
			General clerk	6.06	6.06	
			Time keeper	4.85	4.85	44.86
64	47	107				1167.40

One striking fact at once noted is the relatively very large number of girls and boys employed. They outnumber the men. Some of the girls are employed even in the rolling mill, while in this country there is not, so far as we know, a single woman engaged in manual labor in our iron works of this character. In the tinning department 38 women are at work.

A second fact which a glance at the figures reveals is the low rate of wages paid throughout. Even with double the outlay for labor per box, the efficiency of

labor here would have to be very much greater to allow wages to be paid which could be at all satisfactory.

From the same source comes the following estimate of cost of producing tin plate in Wales:

Materials Used to Manufacture.

Steel bars at works, 136 pounds (@ £4. 15/ gross ton)	\$1.39
Block tin, 3 pounds per box	.62
Sulphuric acid	.10
Flux for tinning	.01
Coal for steam and heating through works	.16
Castings for general repairs	.04
Lamps, oil and lighting	.01
Clay, brick eye	.02
Lumber for packing boxes	.06
Nails, hemp, skins, brushes, &c.	.004
Bras for cleaning plates	.01
Palm oil	.06

Materials	\$2.52 1/2
Labor	.58 1/2
	\$3.11

Credit.

By shearings, 28 pounds	.10
By tin scruff and copperas	.08
	.18

IC plates, 20 x 14, cost per box \$2.93

It will be observed that this cost is based upon steel bars at £4. 15/, against £5. 2/6 in the statement printed in the last issue of *The Iron Age*. On the other hand, a larger quantity of tin, 3 pounds instead of 2 1/2 pounds, is used per box. We may note in this connection that even the higher quantity is one which American manufacturers could not afford to descend to, since it must be their aim to produce goods of excellent quality.

The Scranton Steel Company Suit.

The *Bulletin* of the American Iron and Steel Association prints the following:

William Walker Scranton and Walter Scranton have filed in the United States Circuit Court for the Western District of Pennsylvania their answer to the bill in equity of Louis H. Bristol and others, who instituted proceedings against the Scrantons and the Scranton Steel Company to secure an accounting of certain payments made to W. W. and Walter Scranton by the Lackawanna Iron and Coal Company at the time of the recent consolidation of the Scranton Steel Company and the Lackawanna Iron and Coal Company. The Messrs. Scranton deny that they undertook to sell to the Lackawanna Iron and Coal Company a controlling interest in the Scranton Steel Company without the participation of every stockholder, or that any transactions looking to the sale of the stock were kept secret from the complainants. The defendants admit that negotiations were opened with the Lackawanna company in 1890 and again in 1891, finally resulting in a preliminary agreement between the two corporations, which was unanimously approved and adopted by the directors and stockholders of the Scranton Steel Company. The consolidation of the manufacturing interests and plants of the Scranton Steel Company and the Lackawanna Iron and Coal Company into the Lackawanna Iron and Steel Company was finally consummated as of the first day of January, 1891.

In pursuance of the terms of agreement of consolidation the Lackawanna Iron and Steel Company delivered to the Lackawanna Iron and Coal Company 600 bonds of \$1000 each, secured by purchase-money mortgage upon all the manufacturing plant of the Lackawanna Iron and Coal Company. William Walker Scranton and Walter Scranton admit that they received from the Lackawanna Iron and Coal Company 350 of these bonds in consideration of a contract given by them personally that they (the Messrs. Scranton) would not thereafter engage, either directly or indirectly, in the manufacture of steel in any of the Northern States, including Maryland, Virginia and West Virginia.

for the term of ten years thereafter. The defendants declare that this agreement was not secretly made, nor was it concealed from the complainants, but all the features of the contract were fully explained at the stockholders' meeting before the final vote on consolidation was taken.

The Messrs. Scranton declare that the Lackawanna Iron and Coal Company entered into this agreement with them for the purpose of meeting any future competition on the part of the defendants by a purchase of their individual skill and labor for a future ten years. This agreement was wholly independent of the Scranton Steel Company, which had no moral nor legal right to demand that skill and labor, and for which the Scrantons were alone entitled to receive a just and proper compensation. The defendants aver that their skill and technical knowledge, and the improvements adopted by them, enabled the Scranton Steel Company, with the small capital they had in the business, to hold their own with the concerns of larger capital. At the time of the consolidation there was no profit to the Scranton Steel Company in the manufacture of rails, and only by a large additional outlay of capital could the company profitably pay dividends for some years to come. The Scrantons preferred an increase of capital to consolidation, but the other stockholders were loth to subscribe the necessary amount, and the consolidation was determined. The exclusion of the Scrantons from personally engaging in competing business was an essential part of the plan of consolidation insisted upon by the Lackawanna Iron and Coal Company.

The agreement by which the Scrantons were to receive the \$350,000 in bonds was again fully explained to the stockholders of the Scranton Steel Company at a meeting held on May 18, 1891, and a resolution was introduced calling upon the Scrantons to turn over to the treasurer of the Scranton Steel Company the \$350,000 in bonds or the proceeds thereof, but a majority of the stockholders voted against this resolution. The defendants declare that should the agreement between them and the Lackawanna Iron and Coal Company be rescinded or declared void the Scranton Steel Company and their stockholders would not be benefited thereby, but the bonds in dispute would belong to the Lackawanna Iron and Coal Company.

The Messrs. Scranton deny the existence of any promise always to hold their special knowledge and skill for the benefit of the complainants as distinguished from other stockholders of the company. The defendants state that they furnished their best skill and knowledge, and did successfully compete with all rival companies until they were joined by all the stockholders of the Scranton Steel Company, who urged the yielding up of such competition by the consolidation, which has yielded a far higher value and profit to all stockholders than was possible by continuing the competition.

Finally, the defendants state that, in all negotiations for consolidation, the full moral and financial effect of their skill and knowledge belonged to the Scranton Steel Company, and increased the compensation paid to the Scranton Steel Company over and above the actual value, present and prospective, of their property and business, and the contract for the future services of the Scrantons in no way diminished the consideration thereof, and was wholly independent of the consolidation, except this, that without the purchase of the personal contract not to enter into competing business the consolidation would not have been accepted by the Lackawanna Iron and Coal Company and the Lackawanna Iron and Steel Company.

The Kent Furnace.

Geo. R. Bull, the superintendent of the Kent Iron Works, scouted the idea advanced by the *Farmer* recently, and repeated in many free-trade journals, that the McKinley bill was the cause of the closing of the iron works at Kent, Conn. Mr. Bull said that the Kent Iron Company had been doing business and employing about 100 hands for 23 years, and that during that time the works had been closed several times for a year or more, on account of an accumulation of products. For the same reason the works are closed now. The McKinley bill had nothing to do with the case, for the simple reason that it does not affect their products one way or the other.

Mr. Bull said to a representative of the *Bridgeport Standard*: "We are unable to compete with large firms in the same line because we have the disadvantage of lack of modern facilities which it would be impossible for so small a plant as ours to use with profit. Our product of pig iron is about 15 tons a day, while many of the firms with which we compete produce 200 tons a day. Small iron furnaces are being crowded to the wall, but it is caused by the greater facilities of the large furnaces and not by the McKinley bill."

Deep Water and Lake Ore Transportation.

In a letter to the Deep Waterways Convention, held in Detroit, Mich., last week, W. G. Mather, president of the Cleveland Iron Company, thus shows the advantage of deep water in lake transportation of iron ore:

"Take, for example, the Pontiac, which now carries 2700 tons on 15½ feet of water; if loaded to her maximum capacity—namely, 20 feet—she would carry about 4000 tons, or 1300 tons, more or less, in addition to her present capacity, on the present draft of water from Escanaba, to say nothing of Lake Superior. This is an additional capacity of about 50 per cent. The extra cost of carrying this (exclusive of handling charges) would be very slight, only a little more for fuel and a little more time taken for loading and unloading. I should say, therefore, roughly speaking, that the Pontiac on 20 feet of water would be able to carry 4000 tons at a rate of from 25 to 50 per cent. less than that of the past year, and still make just as much money as in that year. In other words, the rate from Escanaba last year was 75 cents; she could undoubtedly on this deep draft make as much money at 50 cents per ton as she did at 75 cents per ton.

"Such a tremendous reduction in the cost of transporting our ore over only one portion of the distance between the mine and the furnace would undoubtedly inure greatly to the benefit of our mines in widening our market and enabling us to more readily get into the Eastern market. By also enabling us to sell our ore cheaper in our own present markets—namely, Illinois, Ohio and Pennsylvania—we can more readily face the competition of Southern iron, and enlarge the markets for the furnaces now using Lake Superior ore, and thereby react favorably in the shape of a largely increased demand for Lake Superior ore."

Howe, Brown & Co., Limited, and the Crescent Steel Company, both steel manufacturers of Pittsburgh, will have an exhibit at the World's Fair in Chicago in 1893. The Star Encaustic Tile Company of that city, manufacturers of tiles, and the Pittsburgh Reduction Company, also of Pittsburgh, manufacturers of pure aluminum, will also be represented by exhibits.

MANUFACTURING.

Iron and Steel.

We are advised that creditors representing about 90 per cent. of the indebtedness of Jas. P. Witherow, engineer and contractor, Pittsburgh, Pa., have signed the paper granting a four years extension to Mr. Witherow. Arrangements are now being made by Mr. Witherow which will give him control of his large plant at New Castle, Pa., which has been operated by A. W. Thompson, receiver, for several months past. Mr. Witherow expects to secure possession before January 1, 1892, and the second mortgage securing the indebtedness of the creditors has already been drawn up. Mr. Witherow has a number of very desirable contracts on hand, and is anxious to secure possession of his works at the earliest moment possible, in order that work on these contracts may be commenced. As before stated in these columns, 25 per cent. of the indebtedness with 6 per cent. interest becomes payable on or before December 31, 1892.

Haselton Furnace, at Haselton, Ohio, owned and operated by the Andrews Brothers Company, which has been out of blast for about six weeks for repairs, has again been put in operation. The furnace is now in excellent shape, and it is expected to turn out a large product.

The Greensburg Rolling Mill Company of Greensburg, Pa., have been granted a charter of incorporation, with a capital stock of \$100,000. This new concern is composed principally of capitalists of Greensburg, and they propose to operate a rolling mill on the site formerly occupied by the Greensburg Steel Company. The latter concern built a small plant for the manufacture of crucible tool steel, which was operated for only a few months. Some of the parties identified with the Greensburg Rolling Mill were stockholders in the Greensburg Steel Company.

The Hubbard Iron Company of Hubbard, Ohio, manufacturers of bar iron, are just commencing the erection of two Hazelton tripod boilers of 100 horse-power each, which will be attached to two double puddling furnaces. The firm have not as yet decided what horse-power they will put over their heating furnace, and will not make a decision in the matter until they have thoroughly tested the ones they are now erecting in their puddling furnaces.

The Cincinnati Rolling Mill Company will operate the plant of the former Riverside Rolling Mill of Cincinnati, beginning January 1, 1892, producing steel plate fire bed and sheet. The mill has been thoroughly overhauled and put in good repair for starting up January 1 next.

The Springfield Steel Casting Company, Springfield, Ohio, have increased their productive capacity by running an additional heat daily, the total now being three, and their product, steel castings, is meeting with considerable favor, the demand being continually on the increase.

The Lukens Iron and Steel Company of Coatesville, Pa., have just turned out what are believed to be the largest steel plates ever rolled, either in this or any other country—viz, 120 inches in diameter and 9-16 inch thick. These are of marine flange steel, and are to be used in one of the boiler works in the Western States.

The work of building the steel plant projected by Dr. C. J. Eames, at San Diego, Cal., progresses very slowly. The proposition of C. L. Hubbs to establish large rolling mills and shipbuilding yards, locomotive works, &c., at that place seems to have died in its infancy. The projectors of this latter enterprise will make another and more liberal offer to the citizens of San Diego.

From Chester, Pa., comes a story to the effect that a steel casting weighing 17,500 pounds, made by the Standard Steel Casting Company of that place for the Homestead Works of Carnegie, Phipps & Co., was lost in transit. No trace whatever can be found of the casting, which was a plunger for a hydraulic cylinder 16 feet long and 3 feet through, and the supposition is that the braces used to secure it to the flat car broke and the jarring of the train sent it rolling down the mountain or into some river. In the meantime the Standard Works are making another plunger to take the place of the one lost.

The Ironton Structural Steel Company, capitalized at \$1,000,000, have been organized at Duluth, Minn., to smelt and work iron ores and manufacture iron and steel. The main office will be in New York, and a plant will be erected near Ironton. The incorporators are Rudolph T. McCabe and Wm. R. Meath of New York, and Robert C. Belville of Trenton, N. J.

The Carpenter Steel Works of Reading, Pa., were visited by fire on the 26th inst., resulting

in the almost total destruction of the works. The office and one mill were saved out of the entire plant. At the time of the fire the establishment was working on a large Government contract for steel projectiles. The loss is placed at \$150,000, on which there is an insurance of \$125,000.

The plant of the West Superior Iron and Steel Company, at Superior, Wis., is shortly to be put in operation. Ship plate and structural iron will be the product at present.

After operating for six months the Valentine Iron Company of Bellefonte, Pa., successors to the Center Iron Company, have declared a dividend amounting to \$18,000.

The newly remodeled Edith Furnace of the Oliver Iron and Steel Company, Pittsburgh, will be blown in during the first week in January.

The Port Townsend Steel Wire and Wire Nail Company have been incorporated at Port Townsend, Wash., with a capital stock of \$100,000, divided into 20,000 shares of \$5 each. J. M. Lively, general manager of the New Philadelphia Wire and Nail Company of Ohio, has subscribed for 8000 shares.

The repairs to the Haselton Furnace, at Haselton, Pa., have been completed and the furnace blown in.

The new Swede Furnace at Swedeland, Pa., is being dried out preparatory to going in blast early next year.

Sarah Furnace, at Ironton, Ohio, which has been undergoing repairs for some time, is about ready for blast, but will not resume operations until some time in February.

The new Bessemer steel plant of the Ashland Steel Company, located at Ashland, Ky., and erected by the Pittsburgh Iron and Steel Engineering Company of Pittsburgh, will probably commence operations early in January. This concern will make slabs for the nail factory of the Norton Iron Works of Ashland, Ky., and the Belfont Iron Works Company of Ironton, Ohio. Bessemer pig will be furnished by the blast furnaces of the Norton Iron Works and the Belfont Iron Works Company.

The Standard Iron Company of Bridgeport, Ohio, have some extensive additions in contemplation. If the concern can secure reasonable concessions from the city of Martin's Ferry in the way of satisfactory service for the proposed extension, and the city will legally vacate in favor of the firm some parts of streets rarely used, the firm will build four sheet-finishing mills west of their present mill buildings. The object in the erection of these mills is to allow the firm to work their product a little more satisfactorily, as they are now making more muck bar and some other forms of raw material than the finishing departments of their plant can satisfactorily handle. The proposed extension to the plant will give employment to about 150 additional men. The output of the extension will amount to from 6000 to 7000 tons annually of 8-gauge sheets. If this addition is made, the Standard Iron Company will have one of the largest plants in the country for the manufacture of iron and steel sheets.

The Keystone Rolling Mill Company, Limited, of Pittsburgh, have discarded the use of natural gas, coal being substituted in all departments. Recently a Heine boiler of 175 horse-power was put in the works, and the increasing capacity of the mill makes the addition of 300 horse-power boilers necessary, and the same type of boiler will be used. A coal elevator has also been erected to supply the five heating furnaces. This plant is now very well equipped for the manufacture of skelp iron of all sizes, of which the mills make a specialty.

The site of the old city poor farm of Pittsburgh, located at Homestead, Pa., and purchased about one year ago by Carnegie, Phipps & Company, Limited, is fast being used by that firm in the enlargement of the plant of the Homestead Steel Works. Immediately after the purchase of the site by the firm they commenced to extend their plant and erect thereon numerous buildings. Among the number is the immense new beam mill, the largest and most complete of its kind in the world. There has also been erected a department for the pressing and shaping of armor plates, an immense machine shop, an electric light plant, a large warehouse for storing refractories and other material used in the works. Notwithstanding the erection of the above buildings, there is yet considerable ground left which can be utilized at any time desired by the firm. It is stated, however, that only that portion of the property lying below the Pittsburgh, Virginia and Charleston Railroad, and the Pittsburgh, McKeesport and Youghiogheny Railroad, extending along the Monongahela River bank as far as the Homestead Borough line, will be reserved for manufacturing sites. All that portion of the site that lies above the Eighth avenue extension and reaching out over the

hill above Munhall, nearly half a mile in length, will be placed on the market as building lots. The plan of lots has already been drawn up, and shows that there are 387 lots in all, with a frontage of 50 feet and a depth of 100 feet each. It is also stated in this connection that a site for the erection of a library has been reserved, the dimensions of which are 240 x 300 feet. It is said that Andrew Carnegie contemplates the erection of a free library on this ground, which he will present to the town of Homestead.

The report going the rounds of the press that the National Tube Works of McKeesport, Pa., were to be removed to Hammond, Ind., has been officially denied by the company.

Machinery.

Thos. Carlin's Sons, founders, engine and boiler builders, Allegheny, Pa., have received an order for four large tubular boilers from the Blairsville Tin Plate Company, who are erecting a tin-plate plant at Blairsville, Pa. They have also received a second order from the Chambers & McKee Glass Company of Jeannette, Pa., for a 50 horse-power fire-box boiler. In both instances the boilers were shipped the working day following the receipt of the order. While in the office of Thos. Carlin's Sons a few days ago a representative of *The Iron Age* was shown a very neat little working model of an ore grinding pan as used for rolling mill and steel works purposes, made exactly to a scale of 1 inch to the foot. The model is made almost entirely of aluminum and weighs with block to which it is secured 14½ pounds, while the original machines weigh in the neighborhood of 42,000 pounds.

The Detroit Dry Dock Company have closed contract with the Berlin Iron Bridge Company of East Berlin, Conn., for a new fire-proof modern machine shop, which will enable them to build the largest engines. The plant will have modern appliances, such as electric cranes, two of 20 tons capacity running the whole length of the building, new machinery, electric lights, &c. The shop will be 201 feet long by 66 feet in width, running along Orleans street, with end facing Guion and Atwater streets, and partly overlapping the present quarters, which will be torn down. The main portion of the building will be 200 feet long, 37 feet wide and 50 feet high in the clear, the two electric cranes running the whole length, with 38 feet of clear space above the floor. Large windows will be placed along the sides, giving abundance of light, and a skylight with 12 feet of clear glass will run along the whole roof. Three galleries 28 feet wide will open out on the main shop, extending its entire length. The first two will be occupied by light machinery benches, and the top gallery will be arranged for the storage of patterns. Work on the new building will be begun immediately. Two-thirds of it will be erected in eight weeks and completed in ten. The remainder will be completed as soon thereafter as the old shop can be cleared away.

The Pennsylvania Diamond Drill Company of Birdsboro, Pa., are just finishing a 5-ton jib crane for the Carpenter Steel Works of Reading, Pa. They are also building small vertical engines, Clerk gas engines, besides doing general foundry work. The plant of this company is quite extensive. Their diamond drill is well known, and has always been a leading specialty.

The Jeffrey Mfg. Company of Columbus, Ohio, have added a line of link belting, made from their own patterns, to insure uniform pitch. These are made to work on standard sprocket wheel so that they are interchangeable with other makes of corresponding numbers.

The Toledo Machine and Tool Company of Toledo, Ohio, have been very busy since moving into their commodious quarters, corner of Superior and Oak streets. They are constantly bringing out new and special machinery in addition to their regular line of power presses. They are running to their full capacity, and the outlook for the coming year is very bright.

Watson & Stillman of 204 East Forty-third street, New York, have just added to their list a new size hydraulic jack having a capacity of 30 tons, high over all of 37 inches, and a rise of 22 inches. It is made with a broad steel base, and is specially designed for lifting palace cars.

Webster & Perks Tool Company are one of the new and live institutions of Springfield, Ill., occupying their two-story building 125 x 40 feet. On October 1 they commenced operations, having equipped their factory with the latest and best improved machinery for the manufacture of special tools and machinery and also their solid die bolt threading machines. Ideal automatic safety elevator gates and reducing wheels for engine indicators. The members of the firm are J. F. Webster and A. J. Perks. Mr. Webster has for a number of years officiated as superintendent for several of the

largest sewing machine factories in this country and has also been connected with Wilson, Whiteley & Co. and Amos Whiteley & Co., for the past 12 years. A. J. Perks has had a long experience as toolmaker for several local factories, and has also been connected with Wilson, Whiteley & Co., lately as their assistant superintendent.

The annual meeting of the stockholders of the Hitchcock Mfg. Company, Cortland, N. Y., will occur January 12, 1892.

Watertown, N. Y., is to have another manufacturing industry in the shape of a plant to produce a new water-tube boiler.

Last week a charter was issued to the Carlin Mfg. Company of Pittsburgh, with a capital stock of \$50,000. The officers are: David Carlin, president; R. Kerr, treasurer, and G. R. Williams, secretary. A protest against the issuing of this charter was filed by Thomas Carlin's Sons, founders and engine builders, of Allegheny, Pa., who claimed that the similarity of title would cause confusion and loss, as the firm manufacture a number of articles under letters patent, which are known to the trade as "Carlin," and this name appears on the articles in question. The objection, however, was overruled. The new firm propose to manufacture plumbers' iron ware, fine castings and green sand core work. Their plant is located in Allegheny, Pa.

A meeting of stockholders of the Wm. Anson Wood Mower & Reaper Company, which concern formerly operated a plant at Youngstown, Ohio, was held in that city last week, at which the following directors were elected: C. H. Andrews, Henry Tod, Robert McCurdy, Tod Ford, W. J. Hitchcock, John C. Wick, L. E. Cochran, L. Lane and Wm. Tod. The directors organized by electing C. H. Andrews president, Henry Tod vice-president and Tod Ford secretary and treasurer. A resolution was passed providing for the dissolution of the corporation and final winding up of their affairs.

The Locke Machine Works, at Bradford, Pa., have been destroyed by fire at a loss of \$10,000.

Frank H. Elson has broken ground at New Haven, Conn., for a boiler factory.

A receiver has been appointed for the Goshen Boiler and Machine Works, Goshen, Ind.

Hardware.

The fire which recently occurred in the factory of Haberman Mfg. Company, near Laurel Hill, L. I., was reported as having caused some \$50,000 damages. The company advise us that the reports were very much magnified, as they were only damaged to the extent of about \$500, and that the repairs have already been made.

The firm of John M. Waddell Mfg. Company, Greenfield, Ohio, manufacturers of hardware specialties, have been incorporated, the Sun Novelty Works of the same place being consolidated with the first-mentioned concern. The new company will have a paid-up capital stock of \$50,000 and will at once commence plans for the erection of a large addition to their present factory plant, which will give them one of the largest and best equipped manufacturing plants in the country for the production of their line of goods. Special efforts will be made to push the sale of their products during 1892, and a variety of new goods will be brought out.

Elbel & Co., Canton, Ohio, manufacturers of saddlery, advise us that they are very busy, running six days a week, employing 300 hands making horse jewelry. They refer to prices as being low, with no prospect in the near future of improvement.

Miscellaneous.

Last week a charter was granted to the Vesta Coal Company of Pittsburgh, Pa., with a capital stock of \$250,000. The stockholders are B. F. Jones, Henry A. Laughlin, George M. Laughlin, James Laughlin, Jr., and B. F. Jones, Jr. George W. Bausman is treasurer of the new concern. The above concern is identified with and will be controlled by Jones & Laughlins, Limited, proprietors of the American Iron and Steel Works, at Pittsburgh, Pa.

Sparks from the blacksmith shop set fire to the Kenwood Bridge Works, at Grand Crossing, Ill., on the 24th inst. After a hard fight the department succeeded in getting the blaze under control. The loss to the building was \$2000 and to the contents \$400, consisting mainly in models for new devices in bridge building. The loss is covered by insurance.

The plant of the Bellaire Stamping Company, at Harvey, Ill., is rapidly nearing completion. The buildings are of brick and iron, and have a total frontage of 518 feet. The plant is to be equipped with the latest and

best improved machinery for working sheet metals. The company have a net capital of \$450,000, and are one of the largest industries located at Harvey.

The Pittsburgh Bridge Company of Pittsburgh, manufacturers of iron and steel bridges, roofs, girders and buildings, have been awarded the contract for the train shed of the new Union Depot to be erected in St. Louis, Mo. Their contract consists in furnishing the iron frame work, erected in place ready for roof covering. This building will be about 601 feet wide between centers of outer columns by 700 feet long from the wall of head house to centers of end columns. It is 74 feet in height, from tracks to center of lower chord of middle truss, and 20 feet to a similar point on side trusses, the general form of the roof being circular. The covering will be on secondary purlins of wood, with wood sheathing, the outside covering being of tin. The building will be lighted by a ventilator at the center, running the whole length; also by lateral skylights built above the roof proper, glass being introduced on sides of these projections. It will be one of the largest, if not the largest, train sheds in the United States. About 2600 tons of material will be included in the contract of the Pittsburgh Bridge Company.

Articles of incorporation of the North Carolina Smelting Company have been filed in New Jersey. The capital stock is placed at \$1,000,000, one-half of which is said to be held by a Newark party and the remainder by Baltimore parties. The principal place of business will be Thomasville, N. C., and the operations of the company will be conducted in North Carolina, Virginia, West Virginia and Tennessee.

The Cambridge Roofing Company, with works in Cambridge, Ohio, and Chattanooga, Tenn., are one of the largest manufacturers of iron and steel roofing and siding in the country. They make a specialty of their Crowl's patent standing-seam steel roofing, which finds a ready sale wherever it is used. They are also large manufacturers of corrugated iron, both painted and galvanized standing-seam iron, iron roofing, V-crimped iron roofing, iron weather boards, beaded iron ceiling and siding, roofing paints, eave troughs, conductors, &c. Both establishments of this firm are being operated to their full capacity.

A wire-drawing plant is to be added to the works of the Insulated Wire Company at Sycamore, Ill.

The Cleveland Wheelbarrow and Mfg. Company of Cleveland, Ohio, have removed from their temporary quarters into new and considerably larger shops, located on the corner of Case avenue and Lake street in that city, which they are equipping as rapidly as possible with the latest and most improved machinery, including some of their own design, especially adopted to the manufacture of their line of goods.

George B. Hayes, president of the Buffalo Cast Iron Pipe Company, has purchased a tract of land at Buffalo, N. Y., on which he will erect a new pipe works with a capacity of 60 tons a day. The main building will be 300 x 125 feet.

The Hartford City Washing Machine Company, of Hartford City, Ind., were recently incorporated, with a capital stock of \$10,000. They are now erecting buildings suitable for their requirements, in which new machinery will be placed, upon its completion. They will engage in the manufacture of the Ladies' Surprise Washer, which is referred to as being different in many respects from those already on the market, and as having points of superiority.

A very interesting article of manufacture, which deserves an investigation on the part of users of machinery, is the Wheeler fibrous metallic packing, which is being put on the market by W. Townsend of 25 Whitehall street, New York. It consists of very fine strips of an alloy in which lead predominates, treated with plumbago, and is used for the packing of piston and valve rods. Of the loose material as shipped a ring is made sufficient to make a turn around the rod and as thick as the size of the packing which the box will take. This is wrapped around the rod and made up to the gland to a solid bearing, care being taken to compress the packing uniformly. One condition alone is imperative, and that is that the rod be true and in line. The packing has been in use for some time by the Staten Island Rapid Transit Company, the Edison Electric Illuminating Company and a number of others in the vicinity of New York.

TRADE REPORT.

Philadelphia.

REVIEW OF THE IRON AND STEEL TRADES FOR 1891.

It rarely happens that prices have shown as little change as during the year now closing. The tendency has been almost uniformly toward a lower range, yet the loss in no case has exceeded 5%, and in Pig Iron hardly as much as that. This is the more surprising when we consider the fact that the closing month of the year shows an increase in the output compared with the opening month equivalent to more than 1,000,000 tons per annum. Statistics in regard to stock on hand are not immediately available, but if prices are any criterion there is no reason to suppose that there is any very important increase, although, of course, there is some. Prices during the last month of the year were steadier than at any time since midsummer, which is a pretty good reason for believing that stocks are not greatly out of proportion with the increased output. Half a million of tons on a production of 4,000,000 or 5,000,000 tons would be quite as much or more than 1,000,000 or 1,250,000 would be on the present output, so that even if there is that quantity on hand it need cause no uneasiness, as it simply represents six or eight weeks' consumption.

Nevertheless 1891 has been unprofitable and trying to manufacturers, and with such an experience fresh in mind it seems paradoxical to talk hopefully of the position. But if the enormous production is taken into account, the wonder will be that it has been absorbed with but a very trifling shrinkage in prices. The output must have been very close to 9,500,000 tons, and with a decreased consumption of nearly 1,000,000 tons at the Rail mills, compared with some former years, it is evident that whatever the pecuniary result may have been to producers the volume has been enormous.

To those who are disappointed with the result of the year's business—and that includes nearly everybody—there are some things that are worth keeping in mind. The first half of the year, for instance, came at times very nearly to a general collapse, due to the partial failure of our crop of cereals during 1890, and partly to the extremely precarious financial conditions in other countries.

We not only had less to sell, but we had more to buy than for many previous years. The McKinley bill led to enormous purchases and locked up a great deal of money during the winter and spring months, while the difficulties of such houses as Baring's precipitated many million dollars' worth of securities on our markets, which not only locked up capital when it could be least afforded, but destroyed confidence to an alarming extent.

In the face of these unfavorable conditions, the last half of the year will average the heaviest consumption on record, and if prices have not been remunerative they certainly have not been calamitous. The wonder of it all is that the market has stood up as well as it has, and the reason prices have not improved with the changed conditions is because they have had no chance to improve. Before the crops were matured the Iron trade began to discount the improvement to such an extent that the last half of the year showed at least half a million tons more Pig Metal produced than during the first half. Is it any wonder that prices have not improved, or is it reasonable to assume that because

they have not improved the entire situation has been misunderstood?

Those who have figured on an increasing volume of business have made no mistake, but as every concern that had a mill or a furnace was determined to have it in operation, prices have had no chance to improve, neither are they likely to improve until there is a great deal more business than there is at present. Having considered the reasons for the depression during the early portion of the year and noted that the improved prospects were too heavily discounted during the last half, it may be worth while to consider

What Are the Prospects for the Coming Year.

In a few words it may be said that they were never better. The evidences in favor of this opinion appear to be overwhelming, while on the reverse side there is really nothing worth considering, except perhaps that of a continued increase in production. Without going over the threadbare but none the less important story of big crops, big demand, big prices and of continued increase in railway earnings, the advancing tendency in all classes of securities, &c., the facts appear to be, as already stated, that we produced not less than 4,750,000 tons of Pig Iron during the last half of 1891, without any perceptible change in prices, but on the whole the undertone has become stronger—that is to say, there is a better demand at low figures than at any time within the whole year. The next question which suggests itself is, if we keep on making at the rate of 10,000,000 tons of Pig Metal per year, where is the improvement to come from?

The answer to this question must necessarily be in the nature of a guess, although if common sense reasoning may be permitted, it ought to be guessed with a fair degree of accuracy. We have shown that a decided improvement has already set in as regards the volume of business, and the reason that there is no corresponding increase in prices is because the increased demand has been more than offset by an increased supply. Under the same conditions in 1892 we shall have precisely the same results, but the trade have good reasons for expecting new sources of demand to a greater extent than new sources of supply.

The most conspicuous of these is expected to be a demand for Steel Rails. It is true that the capacity for production of Rails is practically unlimited, but so it has been for two or three years past, so that whatever improvement there is will be so much clear gain, and so much the less competition with Steel "in other forms."

The estimated output of Rails, standard sections, during 1891 is 1,250,000 tons. In 1887 we produced very nearly 2,200,000 tons, and with the impaired condition of many of the roads, the desire to be in good condition to meet the travel during the World's Fair, and with their rapidly improving financial condition, it is not unreasonable to expect a 2,000,000 ton business in 1892. This of itself (assuming that all other interests are in *statu quo*) will increase the consumption of Pig Metal to the extent of nearly 1,000,000 tons, but does any one suppose that the coming year will not develop business in other directions than in Rails?

Innumerable projects that have been in abeyance will be brought to the front now that money is becoming easier. Elevated railroad work, architectural work, bridge building, ship building, car building—everything that has been thought of during the past three or four years—will begin to assume definite shape, simply because the country is prosperous, money abundant and confidence fully restored. It is not unlikely that the trade may yet have to meet a period of unremunerative prices, for the same reason as during the

last half of 1891—viz., discounting the future, until a point is reached at which discounting is no longer possible. A 5% increase in the general iron trade, and a 2,000,000-ton demand for Rails, means an 11,000,000-ton consumption of Pig Metal, and also means higher prices. This may appear to be a very optimistic view of things, but we believe we have shown that it is based on a substantial basis, and although we may not jump into it immediately, it is one of the things that are as reasonably certain of being realized as anything on this mundane sphere can be.

Some well-informed people appear to think that politics will interfere with business during 1892, and while such may be the case to a limited extent, the chances are that the general conditions will be too satisfactory to permit anything of that kind to occur. That, however, is one of the contingencies that each individual will estimate in accordance with his own political convictions. The evil effects of a change of tariff are probably exhausted by this time, and now the country will give it a fair trial to see how much of good there is in it.

Chicago.

(By Telegraph.)

Office of The Iron Age, 50 Dearborn street, CHICAGO, December 30, 1891.

Rarely has the holiday season witnessed such an active buying movement. Large sales are reported of Pig Iron, Bar Iron, Railroad Supplies of all kinds, Sheet Iron, Galvanized Iron, Wire Rods and Metals. A few articles, such as Charcoal Pig Iron, Nails, Structural Material and Plates, are comparatively quiet, but their time is coming also, especially if prices begin to stiffen on the products which are now in demand. Thus far values have not been affected except on Metals, which are appreciably dearer. The outlook is now most promising for the future, and it now looks as if those who have laid in large stocks of material at the low prices recently ruling will soon have cause to congratulate themselves on their foresight.

Pig Iron.—The demand for Coke Iron improves daily, which is a remarkable condition of trade for the time of the year. Buyers seem to have realized that this is their opportunity and there is no hope of their getting lower prices by waiting any longer. Figuring is being done with consumers who have contracts running up to May, but think it best to cover their wants for a still longer period. Manufacturers dislike to make such contracts with the prospects now opening up, but fear that they may lose good customers if they refuse. Prices have not stiffened with the improved demand, but on the contrary concessions have been made on both Northern and Southern brands which will make the December sales take rank among the lowest of the year. The last two weeks of this month, it is claimed, will show more Iron sold here than the whole of the previous two months. Lake Superior Charcoal is rather quiet. Inquiries are fair, sales are slow. Most furnace companies ask \$17, but there are still some brands available at slightly lower figures. Quotations are as follows, f.o.b. Chicago:

Lake Superior Charcoal.....	\$16.75 @	\$17.25
Local Coke Foundry, No. 1.....	15.50 @	16.00
Local Coke Foundry, No. 2.....	14.50 @	15.00
Local Coke Foundry, No. 3.....	14.00 @	14.50
Local Scotch.....	16.00 @	16.50
Ohio Strong Softeners.....	17.75 @	18.25
Southern Coke, No. 1.....	15.50 @	16.00
Southern Coke, No. 2.....	14.75 @	15.00
Southern Coke, No. 3.....	14.00 @	14.25
Southern, No. 1, Soft.....	14.75 @	15.00
Southern, No. 2, Soft.....	14.00 @	14.25
Southern Gray Forge.....	13.75 @	14.00
Southern Mottled.....	13.25 @	13.50
Tennessee Charcoal, No. 1.....	17.50 @	18.00
Alabama Car Wheel.....	19.50 @	20.50
Coke Bessemer.....	16.50 @	17.00
Hocking Valley, No. 1.....	17.25 @	18.50
Jackson County Silvery.....	17.50 @	18.00

Spiegeleisen.—Is unchanged at \$28 for 20%.

Bar Iron.—Manufacturers report orders coming in rapidly and the outlook appears to them decidedly in favor of plenty of work at better prices. The bulk of the business done lately has been in Bar Iron. While Bar Iron can still be had from some mills at 1.65¢. Chicago, half extras, most of them are asking 1.70¢, and a few refuse anything short of 1.72½¢.

Sheets.—The market for Black Sheets is active. Roofing Iron contracts are still being placed, and other large consumers are inquiring on deliveries running past the middle of the year. Common Black Sheets are quoted on a basis of 2.95¢ @ 3¢, Chicago, for No. 27. Galvanized Iron is also very brisk. The demand appears to be growing instead of diminishing. The cause is not wholly due to the World's Fair work, as builders state that more is used for general building purposes than ever before. Discount unchanged.

Merchant Steel.—One of the largest concerns handling cheap Steels in this market reports the best trade for December ever known in that month. Other sellers have not been so well favored, but on the whole the trade has been very fair. Carload lots of Machinery Steel from mill are quoted at 2.15¢ @ 2.25¢, Chicago; Open-Hearth Spring, 2.20¢ @ 2.25¢; Tire, 2.10¢ @ 2.25¢; Tool Steel 6¢ and upward, according to quality.

Wire Rods.—A heavy business has recently been done in Wire Rods on private terms, and the local makers have now sold about all they can produce for the next six months.

Other Finished Iron and Steel.—Quite a trade is doing in small lots of Beams and other structural material. Consumers of Beams are restive under low offers of foreign shapes, fully ½¢ per pound under domestic, and would order them if they felt safe in risking the time of delivery. Plates are rather dull as yet, inquiries being slow to develop into actual business. Prices are no higher than they have been.

Track Supplies.—Inquiries for Steel Rails are large, contracts are being closed almost daily for orders ranging from 1000 to 5000 tons, and the prospects are growing better constantly. Lines which took 10,000 tons this year want 25,000 tons the coming year. Small schemes of railroad extension are multiplying with great rapidity and many of them will be finished before close of winter, when Rails will be bought for them. Prices range from \$31 upward, according to the character of the order. Business in Splice Bars has been heavy of late. The tendency is now very strongly toward the use of Steel. Several important lines are purchasing Steel Splice Bars this season for the first time to cover their entire wants. It is a question with some of the Splice Bar makers as to whether they are not oversold. They continue to quote 1.80¢ for either Iron or Steel. Spikes are still held at 2.20¢ @ 2.25¢, and Track Bolts with Hexagon Nuts at 2.70¢ @ 2.75¢.

Old Rails and Wheels.—The market for Old Iron Rails is getting further restricted by the substitution of Steel for Iron Splice Bars. If it were not for this the recent heavy transactions in Splice Bars would have caused great activity in Old Rails. As it is, the mills using Old Rails seem to be well supplied and transactions are light. Stocks are well held, however, and quotations range from \$21.50 to \$22. Short pieces of Old Steel Rails have been sold at \$13.50. They are probably worth \$14.50 as they run. Old Car Wheels are being bought up by dealers, who now ask \$16 @ \$16.50 for them.

Serap.—There is more doing in this line than there has been, but still business is reported very dull by all the dealers. Inquiries are being made by large consumers, but they are slow to close contracts. Selling prices are as follows, per net ton: No. 1 Railroad, \$18.50; No. 1 Forge, \$17.50; Horse Shoes, \$18; Car Axles, \$22; Fish Plates, \$20; No. 1 Mill, \$12.50; Pipes, \$11.50; Sheet Iron, \$8; Cast Borings, \$7; Wrought Turnings, \$10; Axle Turnings, \$12; Machinery Cast, \$12; Malleable Cast, \$9; Stove Plate, \$9; Mixed Steel, per gross ton, \$11.75; Coil Steel, \$15.50; Leaf Steel, \$17.75.

Metals.—All metals are firmer and some considerably higher and quite active at the advance. Carload lots of Lake Copper are now quoted at 11¢ @ 11½¢ and Western casting Copper 10½¢ @ 10¾¢. Consumers of Copper who failed to purchase at the lowest notch are now hurrying to get in before other advances are made. Manufacturers of car brasses are now driven with work and using greatly increased quantities of Copper. Spelter is firm at 4.50¢, but some of the smelters refuse to book any orders at that price, preferring to take their chances in the future. Pig Lead shows more activity, especially for futures, which, however, are only available in a limited way at current quotations. Sales are reported of 600 to 700 tons at and around 4.05¢. The closing is 4.05¢ @ 4.10¢ asked, according to brand and delivery.

E. W. Cramer, 656 Rookery Building, Chicago, has been appointed Western sales agent of the Wellman Iron and Steel Company of Thurlow, Pa., manufacturers of strictly high grade Steel Plates. The company have facilities for the manufacture of Plates up to 10 feet in width.

Cincinnati.

(By Telegraph.)

Office of The Iron Age, Fourth and Main Sts., CINCINNATI, December 30, 1891.

Pig Iron.—There has nothing new transpired in the Iron market during the week. The volume of business is restricted to the immediate necessities of consumers, who are buying in small quantities, and yet in the aggregate the volume is fairly satisfactory. The current demand is divided between Foundry and Gray Forge and prices are fully sustained; in fact, some of the more desirable makes of Iron are bringing more than quotations. It is not expected that there will be any large buying during the remainder of the year. The effort to obtain an advance on Bessemer Iron and on Steel in other markets seems likely to be successful, for the proposed prices are really low, and that is having something of a strengthening effect upon the undertone of the market for Foundry and Gray Forge Iron, but as yet has not materially affected prices of the latter. There is not much movement in Charcoal Iron of any kind, but in view of the reported placing of many orders for rolling stock by the railroads both East and West there is less urgency to sell at the low prices current. The Addystone Pipe Works have shut down for repairs, but will open again early in the new year. Other large consumers of Iron are expecting to require much Iron early in January, and in view of the hopeful outlook for general business there is good reason for encouragement on the part of producers of Iron. Quotations are unchanged, as follows:

Foundry.

Southern Coke, No. 1.....	\$14.75 @	\$15.00
Southern Coke, No. 2.....	13.75 @	14.00
Southern Coke, No. 3.....	12.75 @	13.00
Ohio Soft Stone Coal, No. 1.....	16.25 @	16.50
Ohio Soft Stone Coal, No. 2.....	15.50 @	16.00
Mahoning and Shenango Valley.....	17.00 @	17.50
Hanging Rock Charcoal, No. 1.....	20.00 @	21.00

Hanging Rock Charcoal, No. 2....	19.00 @	20.00
Tennessee and Alabama Charcoal, No. 1.....	16.50 @	17.00
Tennessee and Alabama Charcoal, No. 2.....	15.50 @	16.00

Forge.

Gray Forge	12.25 @	12.50
Mottled Neutral Coke.....	11.75 @	12.00

Car Wheel and Malleable Irons.

Standard Southern Car Wheel....	19.25 @	19.70
Lake Superior Car Wheel and Mal- leable.....	18.25 @	18.70

Cleveland.

CLEVELAND, December 28, 1891.

Iron Ore.—It is not to be expected that much business will be done at this season of the year. Still, some of the unsold Ore on the docks has been let go during the past week at figures averaging about 25¢ per ton higher than mid-summer quotations. Ore is being carried forward to the furnaces as fast as cars can be supplied, and the determination of the Ore men to clear up the docks before the first vessel load of next year's output arrives seems likely to be carried into effect. There is considerable talk regarding next season's quotations. Eastern furnacemen are asking what the probable prices will be and quite a stack of letters of this kind are received by every mail in the big offices of the Ore dealers down on Superior street. It is probable that next season's market will open in February or March, and that prices will range from 50¢ to 75¢ per ton higher than in 1891. A few all-rail shipments are coming in to fill out stocks, and these are likely to continue all winter. The Ore dealers will make no attempt to fix next season's quotations until the condition of the Pig Iron market at the opening of next spring's trade has been determined.

Pig Iron.—The market is still increasing in firmness and strength. This, too, despite the holiday interruption. Actual transactions are, of course, light, but everything indicates a good trade after the beginning of the new year. Mill Irons are in good favor, and so, too, are the better grades of Foundry and Forge Iron. By next week or the week after it is expected that the volume of business will be sufficient to make quotations of some value. We hear of a small sale of Soft Silvery Ore at private terms. Following are strictly local quotations:

Nos. 1 to 6 Lake Superior Charcoal	\$18.50 @	\$19.00
Nos. 1, 2 and 3 Bessemer, per ton..	16.25 @	16.50
No. 1 Strong Foundry, per ton....	16.20 @	16.70
No. 2 Strong Foundry, per ton....	15.20 @	15.70
No. 1 American Scotch, per ton..	16.20 @	16.70
No. 2 American Scotch, per ton..	15.20 @	15.70
No. 1 Soft Silvery, per ton.....	16.50 @	17.50
Mahoning and Shenango Valley Neutral Mill Irons, per ton....	14.00 @	14.25
Mahoning and Shenango Valley Red Short Mills, per ton.....	14.50 @	15.00

It is reported that Bessemer Irons are stronger this week than for two months past. Many furnacemen are beginning their annual inventories and business is likely to be a trifle light for two or three weeks.

Nails.—Steel Wire Nails have declined to \$1.80 per keg, in stock, and are not very firm at that figure. Cut Nails are still quoted at \$1.70.

Old Rails.—Little is being done and prices are quite weak, even at \$22 @ \$22.50. A small transaction at the latter figure is reported.

Manufactured Iron.—Business continues fairly good. The mills have enough to do, but do not seem to be looking for orders extending into the new year. Bar Iron at 1.65¢ @ 1.70¢ is in good demand. Sheet Iron is not easy to obtain, even at fancy prices.

Scrap.—The market is rather weak and there is no change in prices.

Pittsburgh.Office of *The Iron Age*, Hamilton Building; {
PITTSBURGH, December 29, 1891. }

Pig Iron.—We have to report an unusually active market the past week, especially in regard to Bessemer, which, in addition to being active, has advanced 50¢ @ 75¢ per ton. Sales of some 20,000 tons Bessemer are reported at from \$15.50 up to \$16, cash, 2500 tons having been reported at \$16 yesterday. This spurt, as intimated in our last report, was not altogether unlooked for, but it came sooner than expected. Gray Forge Iron is also more active and strong, but as yet there is not the activity in it that has characterized Bessemer Iron. Foundry Irons continue very dull, and there is not likely to be any improvement until after the advent of the new year. We quote prices as follows:

Neutral Gray Forge.....	\$13.50 @	\$13.75, cash.
All-Ore Mill	14.00 @	14.50, "
White and Mottled	12.50 @	13.00, "
No. 1 Foundry	15.50 @	16.00, "
No. 2 Foundry	14.50 @	15.00, "
No. 3 Foundry	14.00 @	14.25, "
No. 2 Charcoal Foundry	20.50 @	21.00, "
Cold-Blast Charcoal.....	25.00 @	27.00, "
Bessemer Iron.....	15.75 @	16.00, "

It may be stated that most of the Bessemer Iron sold within the past week was for delivery during the first three months of 1892. Some contracts for Gray Forge have also been made for the same delivery, and there are now probably about as many if not more buyers than sellers at prices quoted.

Muck Bar.—The dullness which has obtained for so long continues. Brokers who have it for sale report that they are unable to find buyers. Prices remain unchanged, it being offered freely at \$26, cash, for delivery during the first quarter of the year, and might be bought for less.

Manufactured Iron.—Trade is a little quiet at present, but there is every indication that orders will be coming forward freely before the new year is very far advanced. The outlook for a good, healthy business never was better than at present. Labor complications, which were very numerous until July, spoiled business for the rest of the year, as a great many extensive improvements contemplated which would have required large quantities of Finished Iron and Steel were abandoned, as it was too late then to commence the same. The indications at present are that labor complications will not be nearly so common in 1892 as they have been this year, and if not there is every reason to believe that the coming year will be one of the best our Iron and Steel men ever experienced. At present prices are low and not very remunerative, but with an increased demand these will be advanced to where they will afford the manufacturer a fair return. We continue to quote city-made Iron at 1.67½¢ @ 1.70¢ for Bars, 1.90¢ @ 2¢ for Plate and Tank, and No. 24 Sheet, 2.60¢, all 60 days, 2 % off for cash. Skelp Iron 1.60¢ @ 1.65¢ for Grooved and 1.85¢ @ 1.90¢ for Sheared, four months, 2 % off for cash.

Nails.—We continue to quote \$1.55 @ \$1.60 for 30¢ to 35¢ average, 60 days, 2 % off for cash, f.o.b. at factory in the Wheeling district. While some few sales of Wire Nails have been made as low as \$1.60, f.o.b. at factory, 60 days, 2 % off for cash, there are now very few if any sellers below \$1.70, and then only for immediate or near-by delivery. Negotiations with this object in view have been pending for some time past, but a syndicate in order to make it a success must embrace all the manufacturers, and there are some few firms that cannot as yet be induced to go into an organization.

Wrought-Iron Pipe.—While the manufacturers' Association has not gone to pieces, as reported, the market for Pipe is an open one and each manufacturer is virtually free to make his own prices and this they are doing. The January meeting of the association will take place in Pittsburgh.

Billets and Slabs.—The market has stiffened up materially, in sympathy to some extent with Bessemer Iron, and prices have further advanced. While, so far as we are advised at present, there have been no sales above \$24.50, cash, at makers' mill, there are now but few, if any, sellers under \$25, which may be regarded as the ruling price and which is an advance of \$1.25 @ \$1.50 per ton as compared with the lowest prices of a few weeks ago. The manufacturers of the Pittsburgh and Wheeling districts had a conference here two weeks ago and it is understood that another meeting will take place on Tuesday of next week. While no compact has been entered into by manufacturers in regard to prices, it may be added that the conference already held was soon followed by a much stiffer market. It is stated that some of the brokers who sold short are on the anxious bench.

Ferromanganese.—Is firmer, owing to enhanced cost of Manganese Ores, and we now quote domestic 80 % at \$63 @ \$63.50, cash. Last week sales were made as low as \$62.50. Even at the advance foreign cannot be sold here in competition with domestic.

Structural Material.—New business is a little scarce at present, but the outlook for the incoming year is regarded as being very encouraging. Prices remain unchanged, as follows: Channels and Beams, 3.10¢; Angles, 1.85¢ @ 2¢; Tees, 2.30¢ @ 2.50¢; Universal Mill Plates, Iron, 1.85¢ @ 2¢; Sheared Bridge Plates, 1.90¢ @ 2.10¢; Refined Bars, 1.75¢ @ 1.85¢.

Steel Plates.—There is nothing to report; demand continues light, while prices remain unchanged: Fire Box, 3.75¢ @ 4.25¢; Tank, 1.85¢ @ 2.05¢; Shell, 2¢ @ 2.20¢; Flange, 2.25¢ @ 2.50¢.

Merchant Steel.—There is a moderate business at unchanged prices. Crucible Tool Steel, 6¢ @ 7¢; do. Spring, 4¢; do. Machinery, 4½¢ @ 5¢; Bessemer Machinery, 2.10¢ @ 2.20¢; Toe Calk, 2.10 @ 2.20¢; Tire Steel, 2¢ @ 2.10¢; Steel Bars, 1.80¢ @ 1.85¢.

Barb Wire.—No change in prices. Painted, \$2.45; Galvanized, \$2.95, f.o.b. at factory in the Pittsburgh or Cleveland districts.

Old Rails.—There is a fair business, with sales of Iron at \$22.75 @ \$23, and Steel at \$16.75 @ \$17.25 for short and mixed pieces, and \$17.50 @ \$18 for long lengths.

Railway Track Supplies.—Continued good demand is reported, and prices firm, but unchanged: Spikes, 2.15¢, 30 days, f.o.b. at makers' works; Splice Bars, 1.70¢ @ 1.80¢; Track Bolts, 2.65¢, Square, and 2.75¢, Hexagon Nuts.

Old Material.—Business light, while prices remain about: No. 1 Railroad Wrought, \$19, net ton; Cast Scrap, \$13, gross ton; Steel Bloom and Rail Ends, \$18 @ \$18.50.

Detroit.

WILLIAM F. JARVIS & Co., Detroit, Mich., under date December 28, 1891, say: That there should be a lull in business at this season of the year is to be expected, but the present one shows less buying than usual. Almost every one wants to wait until the beginning of the new year before placing any orders. There is some inquiry for Lake Superior Charcoal, and the

prospects are good for quite an active buying movement early in the new year. The very large business of the railroads and at good rates undoubtedly will give them plenty of money with which to purchase rolling stock and make needed improvements, and all this will help the Iron interests. While the year has been one of disappointment to makers of Pig Iron as regards price, yet the volume has been fully up to the expectations of the majority. The outlook for the coming year is better than last year at this time, although the long-expected good times have not yet come.

With a market entirely devoid of new features, and prices still remaining weak, we quote as follows:

Lake Superior Charcoal, all numbers	\$17.50 @ \$18.00
Lake Superior Coke, Bessemer	16.50 @ 17.00
Lake Superior Coke Foundry, all ore	17.50 @ 18.00
Ohio Blackband (40 per cent.)	18.00 @ 18.50
Southern No. 1	16.25 @ 16.50
Southern Gray Forge	14.00 @ 14.50
Jackson County (Ohio) Silvery	18.25 @ 18.75

St. Louis.

Office of The Iron Age, 214 N. Sixth st.,
St. Louis, December 28, 1891.

Pig Iron.—The market is practically in the same condition as last reported. As is usual at this period of the year, furnacemen and consumers alike are busy with the annual inventory, and sales are naturally small. Some low prices have been made during the past week, especially for Gray Forge, which has been offered as low as \$9.50, f.o.b. cars at furnace, at which price some sales were closed. This kind of inducement generally increases trade to some extent, although it cannot be said to have done so at this time. Consumers are continually looking for and expecting lower prices, and cannot be induced to purchase freely at prevailing prices. Rumors are plenty concerning the low price at which some grades have been offered, and this condition of affairs has a depressing effect on prices, which are now lower than any one imagined they would be six months since. The first of the year has been anxiously looked forward to as the time when the turn will come. Indications, however, are strongly against any advance in prices or increase in business at this time, and it will doubtless be some months after the first of the year before any great change takes place. Locally the condition of trade, so far as the manufacturers are concerned, is considered encouraging. There is plenty of business and the outlook is all that could be desired. Sales, as stated above, have been light, and there were no transactions of any moment that have taken place during the week under review. We quote as follows for cash, f.o.b. St. Louis:

Southern Coke, No. 1 Foundry	\$15.25 @ \$15.50
Southern Coke, No. 2 Foundry	14.25 @ 14.50
Southern Coke, No. 3 Foundry	13.50 @ 13.75
Gray Forge	13.00 @ 13.25
Southern Charcoal, No. 1 Foundry	17.00 @ 17.50
Southern Charcoal, No. 2 Foundry	16.50 @ 16.75
Missouri Charcoal, No. 1 Foundry	15.50 @ 16.00
Missouri Charcoal, No. 2 Foundry	15.00 @ 15.50
Ohio Softeners	17.75 @ 18.75

Bar Iron.—There is some slight improvement noticeable in the demand. Mills, however, are still looking for business, and the present month will doubtless prove a disappointment. To induce the placing of orders concessions have been offered, which in some instances have been accepted. As a rule, however, this inducement on the part of the mills did not have the desired effect. Prices are quoted as follows: Carload lots at East St. Louis, 1.70¢ @ 1.75¢; small lots from store, 1.85¢ @ 1.90¢, according to quality.

Barb Wire.—No change to note. Sales are light at unchanged prices. Rumor has it that prices will be advanced January 1, but we are unable to verify it. We quote as follows: Painted, 2.70¢; Galvanized, 3.20¢; terms 60 days, or 3% discount for cash in ten days.

Wire Nails.—No change to report. Sales are made at \$1.95 for lots from mill, while \$2.10 @ \$2.15 is quoted for lots from store.

(By Telegraph.)

Metals.—Jobbers are busily engaged taking stock, and business is naturally slow. Salesmen are in from the road to spend the holidays and the mail-order trade is not very large. There is no heavy demand for any special line of goods and prices are as a rule well maintained. Wire Nails continue to be offered at prices that are considered very low. Barb Wire will probably be advanced before this report appears. The Columbia Patent Company are in session to-day at Chicago, and it is pretty generally understood that prices will be advanced, to take effect January 1. Collections are somewhat slow. There has been no change in Pig Lead during the past week. Offerings are scarce at 4¢, and from this to 4.05¢ is the ruling price to-day. The market is firm, and the outlook for higher prices is considered encouraging. In Spelter there has been no change. Sales have been confined to car lots for immediate delivery. Offerings are free at 4.45¢, but there are no buyers at this price.

New York.

Office of The Iron Age, 96-102 Reade street,
NEW YORK, December 30, 1891.

American Pig.—The situation has not materially changed, sellers generally reporting the market to be very quiet. The Thomas Iron Company has not booked any further orders of consequence. It is worthy of note that part of their sales which were made to car builders has been at a fixed price, payment to be made in the bonds of the railroad company purchasing the rolling stock. The other business was taken on the usual terms, guaranteeing that there be no advance above prices now established and protecting the buyer against a decline. We quote Northern brands, \$16.75 @ \$18 for No. 1; \$16 @ \$16.50 for No. 2, and \$14 @ \$14.50 for Gray Forge. Southern Iron sells at \$16 @ \$17 for No. 1; \$15.25 @ \$16 for No. 2, and \$13.75 @ \$14.50 for Gray Forge.

Spiegeleisen and Ferromanganese.—Importers of Ferro state that their principals adhere to their prices firmly on the ground that a good deal of English Ferro is going into the French market in anticipation of the change in the tariff, and on the ground that the supply of Manganese Ore has been restricted through the falling off of Chili exports, so that the price has advanced until now it is equivalent to 36¢ a unit, ex-ship, American port. Spiegeleisen is very dull at nominally \$23 @ \$23.50 for 10 and 12% and \$26.75 @ \$27 for 20%. We quote Ferro \$62 @ \$62.50.

Billets and Rods.—The Eastern market is firmer, in sympathy with the advices of a rising tendency in Pittsburgh. There Soft Steel Billets are now quoted \$25, although so far as the price here goes, no business of any consequence has been done at the advance. Bessemer Pig has also stiffened in the West, and all low sales of

Wire Rods have ceased. No very recent transactions have taken place to allow of a distinct statement as to what price Rods could now be bought at. Foreign Billets are very dull at \$30.75 @ \$31, nominally, while Wire Rods may be quoted \$37 @ \$37.50, tide water, nominally.

Steel Rails.—The most important transaction closed during the week was the sale by an Eastern mill of one lot of 22,000 tons to an Eastern road. Smaller transactions in lots of a few thousand tons will probably swell the total of business of the last two weeks up to 30,000 tons. There is a good deal of speculation as to the probable requirements of the next year. An authority in Chicago, looked upon as having exceptional facilities for acquiring the information, holds that the first step on the part of the railroads in the West will be the purchase of additional rolling stock, to be followed later on by heavy buying of Rails. It is insisted also that the construction work during the next year will be considerably larger than it was in 1891. Quotations remain unchanged at \$30 at Eastern mill.

Manufactured Iron and Steel.—In response to an inquiry the Collector of this port has reported that up to date the imports of foreign Beams amount to 2681 net tons, while it is estimated in the trade that contracts have been placed abroad for an additional quantity estimated at 1300 to 1500 tons. The Boston market is entirely in the control of foreign makers, one importing firm in that city having recently sent out a circular to the effect that in the future a stock of different sizes of foreign Beams, exact American section, will be carried. Manufacturers report generally that the current business in structural material is light. Plates are still being offered at low figures. We quote: Angles, 1.90¢ @ 2.10¢; Sheared Plates, 1.85¢ @ 2.25¢; Tees, 2.40¢ @ 2.75¢, and Beams and Channels, 3.1¢, on dock. Steel Plates are 1.9¢ @ 2.1¢ for Tank; 2.15¢ @ 2.30¢ for Shell; 2.40¢ @ 2.65¢ for Flange; 2.60¢ @ 2.75¢ for Marine, and 3¢ @ 3.25¢ for Fire Box, on dock. Bars are 1.7¢ @ 1.9¢, on dock. Scrap Axles are quotable at 2¢ @ 2.20¢, delivered. Steel Axles, 2¢ @ 2.2¢, and Links and Pins, 2.1¢ @ 2.20¢; Steel Hoops, 1.95¢ @ 2.05¢, delivered.

Merchant Steel.—We quote Hot-Rolled Shafting 1.95¢ @ 2.10¢; Machinery, 2.05 @ 2.15¢; Tire, 2.10¢ @ 2.25¢, and Toe Calk, 2.15¢ @ 2.25¢, delivered.

Old Material.—No transactions of any consequence are reported and the market remains, nominally, \$21 @ \$21.25, Jersey City, for light Rails, and \$19 @ \$19.25, Jersey City, for No. 1 Wrought Iron Scrap.

Foreign Ore.—Importers of Iron Ore report only a moderate business lately. Prices for Ore abroad are low and freights to Atlantic ports are down to close figures, since tramp steamers seek cargo this way when coming for grain to be shipped to Europe. We understand that what may be termed standard Bessemer quality is offering at 8¢ per unit, ex-ship, while other ores, like the Porman, are available at lower figures. If prices of foreign Ores remain later in the season as low as they are now, notable quantities may be placed in the Pittsburgh and Wheeling districts, from which they were pretty thoroughly excluded during the past year. This contingency is one which the Lake mines should keep in view when dealing with the question of prices for the next season.

The Delaware River Iron Shipbuilding Company are building a steamer for the St. Lawrence service of the twin-screw type, and hope to displace all the old-fashioned side-wheel steamers on that route.

Metal Market.

Copper.—The turn for the better in the tone of the market, to which reference was made last week, has gained some force and at this writing the undercurrent is one of firmness. In explanation of this, the statement is made that home consumers' purchases of Lake Ingot for delivery during the first two months of next year now involve a total somewhere between 10,000,000 and 15,000,000 pounds and that export inquiries have been made that give promise of a fairly good movement for foreign account ere long. As to the extent of the home trade purchases, accurate data are not volunteered at headquarters, but the fact is clear that offers of 10½¢ for various-sized parcels have been turned down by several producers during the past few days and the presumption therefrom is that a comfortable amount of orders stands on the books of the mining companies. The upward movement of values in the foreign market is also considered significant, since local movements are a key to operations abroad. In casting brands there has been rather more movement. Of one brand about 500,000 pounds went at 9¼¢ for future delivery and some small parcels for earlier shipment have been placed at ½¢ @ ¼¢ more. At the close it seemed doubtful that less than 10½¢ would be accepted for Lake Superior product for delivery during the next three months.

Pig Tin.—During the early portion of the week under review about 175 tons changed hands in a speculative way at 19.85¢ for delivery this month and next. The movement was chiefly against old "puts" and new ones, however, and reflected no change in the attitude of local operators. No new interest on regular lines appears to develop within the trade proper or on the outside, nor does the ordinary trade movement extend beyond merely routine proportions. For that matter, the continued offering of 5 and 10 ton lots to out of town trade at the same prices that are fixed for local dealers seems to be gradually losing its novelty and purchases are now made as indifferently as though no such inducements were put forward. Net cash prices are about 19.85¢ @ 19.90¢ for 10-ton lots, local delivery. The same figures have been accepted from out of town buyers for similar quantities and corresponding figures for smaller parcels, say 20.10¢ @ 20.15¢, according to terms.

Pig Lead.—Purchases have been on a very moderate scale. The demand has not improved in the slightest degree and the offering has been extremely reserved. In short, inaction all along the line figures as the one feature of the market. Prices have remained stationary at 4¼¢ bid and 4.30¢ asked for ordinary-sized parcels.

Spelter.—Brass manufacturers are buying in a very indifferent manner, galvanizers are doing no better and from other sources there is merely a retail sort of demand. Smelters resist the rather unfavorable conditions with some success, but the weight of offerings is sufficient to keep the market weak and 4.70¢ @ 4.75¢ seems to be full value for ordinary Western in carload lots.

Antimony.—The market is quiet and without change. Hallett's is quoted at 12½¢, LX at 14½¢ @ 14½¢ and Cookson's at 15¢ @ 15½¢, in wholesale quantities.

Tin Plates.—In spot parcels there has been little doing except in a retail sort of way, chiefly at old prices. For future delivery there has been some buying, but not as much as during the preceding week. Prices for futures have undergone no change of importance. We quote: Coke Tins—Penlan grade, IC, 14 x 20, \$5.25; J. B. grade, do., \$5.35; Bessemer do., \$5.30; Siemens

Steel, \$5.45. Stamping Plates—Bessemer Steel, Coke finish, IC basis, \$5.70 @ \$5.75; Siemens Steel, IC basis, \$5.80 @ \$5.85; IX basis, \$6.85 @ \$7. IC Charcoals—Melyn grade, \$6.50; for each additional X add \$1.50; Allaway grade, \$5.80; Grange grade, \$5.90 @ \$5.95; for each additional X add \$1.10.—Charcoal Ternes—Worcester, 14 x 20, \$5.75; do., 20 x 28, \$11.50; M. F., 14 x 20, \$7.45; do., 20 x 28, \$15; Dean, 14 x 20, scarce; do., 20 x 28, \$10.60; D. R. D. grade, 14 x 20, \$5.25; do., 20 x 28, \$10.10; Mansel, 14 x 20, \$5.40; do., 20 x 28, \$10.30; Alyn, 14 x 20, \$5.45; do., 20 x 28, \$10.50; Dyffryn, 14 x 20, scarce; do., 20 x 28, \$11.10. Wasters—S. T. P. grade, 14 x 20, \$5.10; do., 20 x 28, \$10; Abercarne grade, 14 x 20, scarce; do., 20 x 28, \$9.75.

The Ansonia Brass and Copper Company announce that they have closed their Chicago office, and that they desire all communications to be sent to their main office, Nos. 19 and 21 Cliff street, New York.

New York Metal Exchange.

The following sales are reported:

THURSDAY, December 24.

100 tons Tin, December.....	19.85¢
25 tons Tin, January.....	19.85¢
25 tons Tin, December.....	19.85¢
15 tons Tin, December.....	19.75¢

Coal Market.

The sales agents at their meeting on Tuesday did nothing further than to limit the output for January about 750,000 tons compared with December. Respecting prices a wholesale operator says: "It is only necessary to look at the thermometer." Otherwise stated, says one, "Take the September circular in your hand and wink with the left eye." Individual Stove Coal has sold as low as \$3.80 alongside. Prices for this size of \$3.90 @ \$4 are common, whereas the latest circular is \$4.40, which has never been realized. Steam Coal is dull; Pea, \$2 @ \$2.50, f.o.b.; Buckwheat, \$1.50 @ \$1.75, there being little uniformity. Where buyers and sellers equally desire to trade circulars are of little account.

The total amount of Anthracite Coal mined during the week ending December 19 was 836,000 tons, and since the beginning of the year 39,188,000 tons, an increase of 4,285,000 tons compared with last year.

The Philadelphia Ledger is informed that the terms of the contract to supply 40,000 tons of White Ash Anthracite to the Department of Charities and Corrections, New York, which was awarded to David Duncan & Sons, require the delivery of 27,000 tons of Broken Coal, 9000 tons of Egg, and 4000 tons of Stove at an average of \$3.63 per ton, delivered alongside wharf during the year 1892.

Financial.

The old year goes out quietly, current transactions being narrowed down to present wants, with little speculative trading in any quarter outside of the breadstuff market, while the future is contemplated with satisfaction. Even as to breadstuffs new engagements are moderate, but deliveries on contracts now maturing give employment to a large foreign tonnage. The visible supply is growing more than 1,000,000 bushels a week, despite heavy shipments, although fully three times the quantity has gone out compared with the same time a year ago, and there is no sign of a material diminution for months to come. The one source of perplexity in the trade is the blockade of cars, and this before the corn movement has scarcely be-

gun. Cotton is active at a decline on large crop estimates and full port receipts equal to 240,000 bales for the past week. The outward movement of hog products enlarges, but prices are not affected. Corn is about 5 cents lower. Sugar is dull, but steady. Coffee is slow and easy.

The conspicuous feature is the enormous volume of the export trade, due to bountiful harvests. The exports of merchandise from the United States in November were larger by \$7,166,924 than those in October, which were larger by several million dollars than those of any previous month in the history of the Government. The merchandise exports in November reached the unprecedented amount of \$110,100,220, and while the imports were slightly larger than in the same month in preceding years, the merchandise movement gives an excess in the exports of \$45,511,601, against \$36,138,057 in the previous month and \$24,770,569 in November last year. For 11 months the total exports of merchandise and specie were \$954,254,120, and the total imports \$813,633,513, showing a balance of trade in favor of this country of over \$140,000,000, against less than \$9,000,000 for the corresponding 11 months of last year. Notwithstanding the flow of specie this way for the last few months the total since the beginning of the year shows a loss in the precious metals of over \$48,000,000. The outward shipment's from January 1 to November 30 include \$76,386,392 of domestic gold and \$11,735,527 in domestic silver. The imports for the same time include \$38,951,259 in gold and \$16,112,096 in silver. Apart from natural products the export interest lags.

The stock market toward the close was irregular, but manifested unexpected strength, the Gould securities leading. Missouri Pacific, Union Pacific, Western Union and Northern Pacific preferred all bounded upward. In point of activity Erie led with sales of nearly 162,000 shares. Fully 30 stocks reached the highest prices of the year. Even Richmond Terminal, which has been subject to many vicissitudes, advanced several points. The Vanderbilt dividends equaled the expectations of all excepting the most sanguine. Lake Shore paid the same as last year, and leaves a larger surplus notwithstanding extensive betterments. Michigan Central and Canada Southern pay better than last year. Report says the Richmond Terminal Company are to make an issue of new blanket mortgage bonds, of which \$15,000,000 will go to pay off the floating debt of roads in the system. On Monday one feature was a sharp rise in Chicago Gas and in National Cordage, the latter being affected by the absorption of the works in Brooklyn.

Government bonds closed as follows:

U. S. 4½s, 1891, extended.....	100
U. S. 4s, 1897, registered.....	116½
U. S. 4s, 1897, coupon.....	117½
U. S. currency 6s.....	109

Bar silver closed in London at 43½d. per ounce and in New York at 94½¢ per ounce.

Some drawers advanced their posted rates for exchange, but the fact excited no uneasiness, as heavy gold imports are expected to be resumed before very long.

Money was in abundant supply. Time contracts on prime Stock Exchange collateral are 4 % for 30 to 60 days and 4½ to 5 for three to six months. Commercial paper was in good demand. Rates were 4½ % for 60 to 90 day indorsed bills receivable, 5 to 5½ for four months' acceptances, and 5½ to 6 for good single names having from four to six months to run. The bank statement showed a gain of \$6,285,200 in cash and \$3,822,000 in surplus reserve, making this item \$19,161,500. Loans expanded \$8,415,000. The deposits, amounting to \$446,500,000, are the largest in the history of the Clearing House. This feature, instead of being

regarded with complacency, is commonly taken to indicate business stagnation, or rather lack of commercial enterprise, for which various causes may be ascribed. Imports of gold continue on a moderate scale, but are not needed for the relief of the market, and the return of securities held in Europe may be fully as conducive to the general prosperity. Bond sales at the exchange during the week aggregated \$14,709,000, a natural consequence of the plethora of money, and as the year closes stocks feel the same buoyant influence.

British Iron and Metal Markets.

[Special Cable Dispatch to The Iron Age.]

LONDON, WEDNESDAY, December 30, 1891.

Quiet markets have been experienced all along the line and no new feature of special interest is to go on record for the week.

Prices for Scotch warrants have remained almost stationary at 47/. Cleveland held at 38/1½ @ 38/3 for a time and then receded to 37/9. Hematites fell back to 47/7½, after temporarily reaching 49/ @ 49/1½. Scotch warrant Iron in Connal's stores has decreased 142 tons, while the amount of Cleveland Iron there has increased 232 tons.

In the Pig-Tin market the movement of prices has been narrow, with business chiefly at £90. 10/ @ £90. 15/ for prompts. The offers at present are light, and the demand from all sources is moderate.

Copper has been fairly active, and the market is stronger, with sales of Merchant Bar prompts at up to £46. 2/6. Purchases against short accounts, stimulated by better consumptive demand and cessation of offers from America, have helped the market.

The market for Tin Plate is easier, business being interfered with by the holidays. A fair inquiry from the United States has been experienced, but not much business resulted. Ternes do not bring the advance asked last week.

Scotch Pig Iron.—The market remains very quiet and prices show little change.

No.	Coltness, f.o.b. Glasgow	56/6
No. 1	Summerlee, " "	54/
No. 1	Gartsherrie, " "	54/
No. 1	Langloan, " "	55/
No. 1	Carnbroe, " "	48/6
No. 1	Shotts, " at Leith	57/
No. 1	Glenarnock, " Ardrossan	55/6
No. 1	Dalmellington, " "	49/6
No. 1	Eglington, " "	49/

Steamer freights, Glasgow to New York, 1/; Liverpool to New York, 10/.

Cleveland Pig.—Business has been slow and the market is barely steady. Makers' quote 38/ for No. 3 Middleborough, f.o.b.

Bessemer Pig.—There has been a moderate movement and prices are barely steady at 48/6 for West Coast Brands, Nos. 1, 2 and 3, f.o.b. shipping port.

Spiegeleisen.—Demand continues slow, but sellers ask former prices. English 20 % quoted at 84/ @ 85/, f.o.b. shipping port.

Steel Rails.—The market quiet, but prices a shade better. Heavy sections quoted £4. 2/6 and light sections £5 @ £6, f.o.b. at N. W. England shipping point.

Steel Blooms.—Market very quiet, with makers' quoting £4 for 7 x 7, f.o.b. at N. W. England shipping point.

Steel Billets.—No improvement in the demand and former prices asked. Bessemer, 2½ x 2½ inches, quoted at £4. 5/, f.o.b. at N. W. England shipping point.

Steel Slabs.—Market remains very quiet and unchanged. Bessemer quoted at £4. 5/, f.o.b. at N. W. England shipping point.

Old Iron Rails.—There is little doing and demand is moderate. Tees quoted at £2. 17/6 @ £2. 18/3 and Double Heads £3 @ £3. 2/6, f.o.b.

Scrap Iron.—A slow trade, with prices about the same as heretofore. Heavy Wrought Iron quoted at £2. 10/ @ £2. 12/6, f.o.b.

Crop Ends.—The market very quiet and unchanged. Bessemer quoted at £2. 12/6 @ £2. 15/, f.o.b.

Tin Plate.—Market spiritless, and prices still rather irregular. We quote, f.o.b. Liverpool:

IC Charcoal, Alloway grade	14/3 @ 14/9
IC Bessemer Steel, Coke finish	12/9 @ 13/
IC Siemens	13/ @ 13/3
IC Coke, B. V. grade	12/6
Charcoal Terne, Dean grade	12/3

Manufactured Iron.—Orders are slow and generally small. Prices without change. We quote, f.o.b. Liverpool:

	£ s. d.	£ s. d.
Staff. Ordinary Marked Bars	8 10 0 @
" Common	6 12 6 @	6 15 0
Staff. B's Sheet, singles	7 17 6 @
Welsh Bars (f.o.b. Wales)	5 10 0 @	5 12 6

Pig Tin.—The market quiet and barely steady at £90. 10/ @ 90. 12/6 for spot and £90. 17/6 @ £91, three months.

Copper.—Very firm market at the close, with demand good. G. M. B. quoted at £46. 5/ @ £46. 7/6 for spot, £47, three months, and best selected at £50.

Lead.—The market has remained quiet but steady at £11. 5/ for Soft Spanish.

Spelter.—A moderate business passing, but the market steady at £22. 10/ @ £22. 12/6 for ordinary Silesian.

Imports.

Hardware, Machinery, &c.

Blumenthal & Boas, Hdw., cs., 13
Boker, Hermann & Co., Arms, cs., 7
Botany Worsted Mills, Mach'y, cs., 48
Degrauw, Aymar & Co., Chains, 6; ditto, eks., 6
Edison Electric Co., Mach'y, pgs., 25
Eccles, John, Mach'y, cs., 3
Parseer, B., Iron Ware, cs., 23
Kietmann, P., Mach'y, pgs., 3
Sheldon, G. W. & Co., Mach'y, cs., 12
Werlemann, H., Arms, cs., 7
Wiebusch & Hilger, Arms, cs., 15; Gun Barrels, cs., 13

Order.—Mach'y, cs. and pgs., 22

Chancellor Alexander T. McGill of New Jersey, Andrew Carnegie, Col. E. A. Stevens of Hoboken, Charles McDonald and Alexander Humphries have been elected to the Board of Trustees of Stevens Institute of Hoboken. It has been determined to submit to the next meeting of the Alumni Association a plan whereby 250 of the alumni shall pledge \$10 each annually, which total sum of \$2500 will pay the interest at 5 per cent. of \$50,000 of bonds. With the proceeds of a sale of bonds it is intended to erect a building for a chemical laboratory, which will also provide several additional classrooms. The present laboratory building will then be converted into recitation rooms, with the exception of the upper floor, which will be entirely devoted to the department of mechanical drawing.

Trade Publications.

THE LIDGERWOOD MFG. COMPANY of 96 Liberty street, New York, have just published a pamphlet entitled "Sketches of the Hoisting and Conveying Devices Employed in Phosphate Mining," the object being to illustrate the use of their improved suspension cableways in phosphate mines. Although the cableway illustrated in this book is a new size, it is the same in principle and construction as other and larger forms which have been built by the above company for some years past. As an example of the possibilities of this method of handling materials, attention is called to the cableway now in use at Austin, Texas, which was designed and furnished for the construction of the famous Austin dam. This cableway has a clear span of 1350 feet; the main cable is 2½ inches in diameter, and the load carried is 7 tons.

THE BELKNAP LITTLE GIANT WATER MOTOR is the subject of a circular by the Belknap Motor Company of Portland, Maine. This machine is built on the principle of the turbine, and in power is stated to compare favorably with motors of the old-style, overshot and undershot, of three times its size. The makers claim for this motor a larger percentage of power from water consumed than is realized from other motors on the market.

WE HAVE RECEIVED from the Boston Gear Works of Boston, Mass., a card showing a few samples of gears made by them. This establishment devotes its sole attention to the manufacture of gearing of all kinds. They also make noiseless fiberoid gears of a special hard fiber, and which are claimed to be superior to iron, rawhide or brass for high speeds.

THE SUTZER-VOGT MACHINE COMPANY of Louisville, Ky., have just issued a handsome catalogue descriptive of their ice and refrigerating machinery. Aqua ammonia is used in these machines. They are built and operated on the plan or system described as absorption, and the process is about as follows: Aqua ammonia 26° Beaumé's, is introduced into the generator (or retort, as sometimes named), where it is heated with steam, thereby expelling the ammonia gas from aqua ammonia. The gas ascending into the stand pipe of the generator is rectified, becomes 100 per cent. pure and compressed by its own natural accumulation until sufficient pressure is obtained to force it through pipes to the condenser. In the condenser, by the aid of cold water, in which the pipe coils are submerged, it changes its form into a liquid. It is now allowed to expand and pass into the coils submerged in the brine or freezing tank. Here it does the work of refrigeration by absorbing heat. It now passes into the absorber. In the absorber it combines with the water that was left remaining in the generator, which had in the meantime also entered the absorber for the purpose of a reunion. This reunion results in bringing back the product to its original form, viz.: Aqua ammonia. It is now ready to perform the same trip over again. The ammonia pump starts the new operation by pumping the aqua ammonia into the generator, and thus it goes on as before.

EUGENE MCELWAIN of Bradford, Pa., is the sole agent for the Hoadley cup packer for oil and gas wells. The packers are provided with cup-shaped rubbers, arranged between compressing flanges.

T. D. Ganse, sales agent of the Hartman Mfg. Company of Beaver Falls, will, after the first of the year, be located at Chicago, where he will have charge of the Western business of the Hartman Mfg. Company, the Union Drawn Steel Company and several of the new plants at Elwood.

A steamer loaded with corn for the relief of sufferers from famine in Russia will leave Baltimore for a Baltic port, and a load of flour contributed by the millers in Minneapolis will be sent out by a Government vessel.

The American Society of Naval Engineers, which has a membership of nearly 400, elected Chief Engineer David Smith president.

HARDWARE.

Condition of Trade.

THERE IS LITTLE change in the situation since our last report, the general features of the market remaining as at that time. As usual in the holiday season, travelers being withdrawn and the attention of manufacturers and merchants occupied in closing the year's accounts and making their plans for the coming season, the volume of business is light, orders being limited to pressing requirements for present trade, or for goods required early in the year, the peculiar conditions of which in the matter of price justify purchase. The changes in quotation of goods are few and unimportant, and it is not anticipated that with the first of the year there will be as many revisions of list prices or changes in discounts as sometimes occur at this juncture. The trade as a whole at the close of a fairly prosperous year are anticipating an early activity and a business during the next six months at least satisfactory in volume, with some prospect of an improvement in prices. The year certainly closes with a promising outlook for trade.

Chicago.

(By Telegraph.)

The Shelf Hardware trade is good for the time of year, but not much of a demand is expected at this particular season. Orders are almost entirely for starting up. Traveling men are now at home receiving instructions for the coming season, inventories are being taken, and in general less attention is paid to the sales department than to other matters, which for once in the year claim precedence. Jobbers report numerous inquiries for staple goods, however, showing that the time is at hand when the trade in these goods will be very brisk. Jobbers here are prepared to meet a demand of almost any proportions, being well stocked in anticipation of an unusually large business.

Notes on Prices.

Cut Nails.—During the past week there have been no special developments in the Cut Nail market, prices remaining without important change, with only a moderate demand. Most of the mills are refraining from pushing business at this time, but a few of them have been solicitous of obtaining orders. Quotations are on the basis of \$1.45 for round lots at mill, a figure which is sometimes shaded in special cases. New York quotations are \$1.55 to \$1.60, on dock, the price for small lots from store being \$1.65 to \$1.75.

Chicago, by Telegraph.—Cut Steel Nails have been a shade lower the past week,

caused by the effects of some outside manufacturers to dispose of accumulated stock on a quiet market. Factory lots are to be had at \$1.60 to \$1.65, Chicago, on 30-cent average, while jobbers quote \$1.70 to \$1.75 from store.

Wire Nails.—There is a disposition on the part of the mills to withdraw extreme quotations, and while \$1.60 is probably still obtainable, \$1.65 for carload lots at mill is the present quotation. Orders aggregating a considerable amount have been booked, but as compared with the capacity of the mills the demand is not heavy. The extent of the decline which has taken place during the year is indicated in the fact that the market opened last January at \$2.10. The demand has undoubtedly been stimulated by the low prices ruling and the feeling on the part of purchasers that an advance is more likely than a further decline.

Chicago, by Telegraph.—Wire Nails are reported by manufacturers' agents to be rather quiet just now, although inquiries are being received for January and February deliveries. Some of them are standing firmly at \$1.80, Chicago, for factory lots, and are unshaken by reports of lower prices. It is likely that the Wire Nail market may be stiffened up by an early advance in raw material, as Wire Rods have lately been very active, and the mills have been disposing of their output so far ahead that it will be very singular if Rods continue cheap. Jobbers quote \$1.90 to \$2, stock, with the usual abatement for carloads.

Barb Wire.—Barb Wire both for foreign and domestic trade continues quiet, without change in prices. Jobbers are maintaining quotations, but the volume of business is small.

Chicago, by Telegraph.—An important meeting of the Columbia Patent Company is being held here, but nothing so far has been done which can be made public. The officers of the company state, however, that no action has been taken toward advancing prices, so that the schedule remains in force and is likely to continue for some time.

Copper Goods.—Prices of such Copper and Brass Goods as Rivets and Burrs, Soldering Coppers, Brass Butts, Copper and Brass Wire, &c., continue low and irregular, with recent declines in several of these lines.

Stocks and Dies.—An advance has been made by the manufacturers of Blacksmiths' Stocks and Dies, by which the discount is made 40 per cent. The manufacturers uniting in this announcement are:

J. M. KING & Co., Waterford, N. Y.

HOLROYD & Co., Waterford, N. Y.

BUTTERFIELD & Co., Derby Line, Vt.

Seamless Brass and Copper Tubing.—Owing to the withdrawal of some manu-

facturers of Seamless Brass and Copper Tubes from the combination which has been in existence for a number of years, prices on these goods are in an unsatisfactory condition. It is understood that the fact that Tubes were sold below the recent list led to the withdrawal of some prominent manufacturers. As a result of the dissolution of the association the present price is 5 cents a pound below the list of September 16, 1891, but for desirable orders this price could probably be shaded, as competition is sharp among the manufacturers. Randolph & Clowes, Waterbury, Conn., under date December 24, in a circular to the trade, refer to the combination on these goods as being temporarily suspended, and avail themselves of the opportunity of issuing a price list subject to a discount. They refer to the fact that the trade have long expressed a desire to have prices in this shape, but having been overruled by the other members of the association they have been unable to accommodate them until now. They also refer to the extent of their manufacturing facilities and the quality of their goods. This circular is accompanied by a price-list, discounts on which, it is stated, will be quoted on application.

Curry Combs.—The large trade have received with satisfaction the announcement of the new prices of the American Curry Comb Company, reference to which was made in our last issue. These prices are a considerable reduction on those formerly announced, which, on reflection, were recognized as too high and likely to encourage competition. The prices now announced represent a fair advance on the very low prices heretofore ruling. The policy of the company is to quote net prices and to deal principally with the jobbing trade.

Screws.—The Associated Manufacturers of Screws have made an advance in their prices, the new discounts being as follows:

	Per cent.
Flat Head, Bright.....	70
Round Head, Bright.....	65
Flat Head, Brass.....	70
Round Head, Brass.....	65

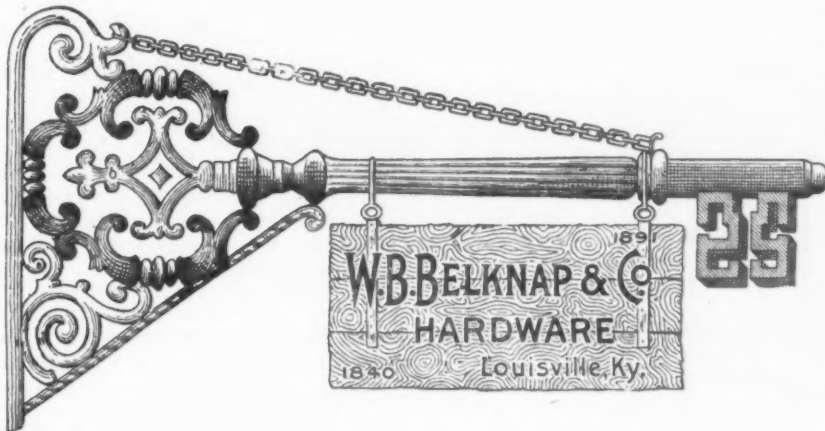
These advanced prices were adopted December 29, and go into effect at once.

Glass.—Owing to the unsatisfactory condition of the Glass market, and to the desire of jobbers to close out undesirable sizes before beginning a new year, it is difficult to determine what is the uppermost feeling in the mind of the trade. It is undeniable that prices have been cut both in the East and West during the past few weeks, notwithstanding the reported scarcity of Glass in first hands, together with the prospective effort to advance prices, which it is rumored the Glass manufacturers will make at the January meeting. It is very unsatisfactory for purchasers not to know what bottom prices really are, and this uncertainty has doubtless kept large buyers from placing orders.

A jobber remarked a few days ago that he would willingly pay 10 per cent. more for Glass if he was assured that such a price was bottom. The conviction among Glass men seems to be gaining strength that Glass will be higher before it is lower, and there appears to be a tendency toward stiffer prices. The following are the nominal quotations on Glass, but as explained above they have not been closely adhered to: American Window Glass, in carloads, 80 and 10 and 5 per cent. discount; less than car lots, 80 and 5 per cent. discount; French Window Glass, 75 and 10 per cent. discount; American Plate is held at a discount of 50, 10 and 5 per cent., and imported Plate at a discount of 60 per cent.

Design for Letter Head.

THE ACCOMPANYING CUT illustrates a design for letter heads, and is used for that purpose by W. B. Belknap & Co., Louisville, Ky. It will be



Design for Letter Head.

recognized not only as unique and appropriate, but also as indicative of the advancement which has been made in the appearance of headings for stationery. The graceful and artistic designs now so largely used contrast most favorably with the stiff and prosaic headings which were in vogue but a few years ago. As is indicated on the sign, the business of this well-known house was established in 1840.

Trade Items.

ST. LOUIS HARDWARE AND CUTLERY COMPANY, St. Louis, Mo., find their present store, at 819 North Fourth street, inadequate for their business. They will, therefore, remove to larger quarters at No. 802 North Second street, next door to the L. M. Rumsey Mfg. Company, occupying the building on January 1, 1892.

THE ANNUAL DINNER given by Sickels, Sweet & Lyon, 35 Barclay street and 40 Park place, New York, was participated in on Tuesday evening, December 29. About 40 employees of the house, together with representatives of the press, enjoyed the hospitality of the firm. It is the yearly custom of the firm to thus remember those in their employ, during the holiday season, and the occasion proved an exceedingly pleasant one.

THE QUESTION as to the desirability of having a Hardware dinner is receiving some attention from the trade, and reference is made to the very pleasant occasions years ago when the entire trade of the city,

with representatives from other centers, were thus brought together in a social way. If the matter were taken up heartily by the trade at large such an assembly of those identified with the diversified Hardware interest of the city would certainly be a pleasant means of bringing together many who meet only in a business way.

IN THE ILLUSTRATED DESCRIPTION of the new Sash Balance, in our issue December 17, it was incorrectly referred to as the J. E. Moore Sash Balance; whereas it is known as the Johnson Sash Balance, so called after the name of the inventor.

WESTBROOK & BYRNE have bought out the Hardware business of Lehman & Mathews, Redlands, Cal., and are largely increasing the stock. They will also add a full line of Glass, Queensware and Lamp Goods. Mr. Westbrook is an experienced Hardwareman, having formerly been connected with the Rankins-Snyder Hardware Company of Louisville, Ky., and lately with Dickey & Westbrook, Newbern, Tenn.

THE NUMEROUS friends of David Nickel of Morris, Ill., vice-president of the Cole-

man, Delamater & Co. No change has taken place in the corporation, stockholders, capital stock or officers, who are as heretofore, John Freeman, president; Thomas J. Chamberlain, vice-president; D. C. Delamater, treasurer, and Charles Gifford, secretary. The capital of the concern was increased some time since and they hope that the promptness and dispatch with which the wants of the trade are attended to will justify Hardwaremen in continuing and enlarging their orders.

WALTER W. WOODRUFF & SONS, Mount Carmel, Conn., have purchased from Edward Storm, Poughkeepsie, N. Y., his entire Carriage-Mounting business, including Patterns, Tools, Machinery, &c., and will continue to manufacture these goods from the patterns thus acquired, in connection with their own large variety of the same class. This consolidation of the two stocks of Patterns, gives Walter W. Woodruff & Sons a very large variety of goods in the line of Carriage Mountings. They will continue to put the goods on the market in the same thorough and efficient manner as heretofore.

HENRY W. PAGAN, the Bicycle dealer at Yonkers, N. Y., has on exhibition in his window a Bicycle made in 1791. It is said to have been owned and ridden by one Nicholas Valentine. It was discovered in an antique garret several years ago by an old farmer. Mr. Pagan came across it on one of his rides into the country. By its side stands a Bicycle of the 1891 make and there is quite a contrast.

RUSH BROS. have recently commenced business at Marlin, Texas, and in addition to a general line of Hardware, are handling Stoves, House Furnishing Goods, Farming Implements and Queensware.

THE WAREHOUSE of Baker & Hamilton, at Sacramento, was destroyed by fire early on the morning of December 23. The losses were, however, covered by insurance. The above firm have agricultural works at Benicia, Cal., and a warehouse at San Francisco, in addition to the one recently burned. Their Eastern office is at 88 Wall street, New York.

E. T. BARNUM, Detroit, Mich., the well-known manufacturer of Art Wire and Iron Work, is making a specialty of ornamental coverings for radiators, constructed of artistically designed Wrought Iron, Bronze, Nickel Plated and Brass Work. The new Catholic cathedral at Davenport, Iowa, was recently furnished with Radiator Screens by this firm. The large increase in the use of steam and hot water for heating purposes has given rise to a very large demand for Screens of this kind. The builders' edition of Mr. Barnum's fall catalogue makes extensive reference to Radiator Screens and illustrates many different designs.

T. D. GANSE, general sales agent of the Hartman Mfg. Company of Beaver Falls, Pa., will, after January 1, locate in Chicago, having his office and warehouse at 508 State street. He will take entire charge of the Western business of the above company, of the Union Drawn Steel Company, Beaver Falls; of the Elwood Shafting and Tube Company, Elwood, Pa., and will also represent several other well-known concerns. Mr. Ganse was until recently secretary of the Union Drawn Steel Company, but retired upon selling out his interest. He is now secretary of the Elwood Shafting and Tube Company, and is more or less interested in the other enterprises of the new town of Elwood, Pa. The territory which with his travelers he will cover will include the States of Wisconsin, Illinois, Missouri, Arkansas, Louisiana, Texas and west to the Pacific Coast.

man Hardware Company, will be grieved to learn that on the 21st inst. he was bereft of his only child, a boy of seven, who died of diphtheria.

F. E. MYERS & BRO., Ashland, Ohio, have just completed a new office at their works. The room is abundantly large to accommodate an increase in clerical force as their business may demand. It is well lighted and arranged to suit the requirements of the business. The ceilings are of metal, and the apartment is referred to as a model in every respect.

OUR READERS will observe among the Special Notices in this issue one signed "Hardware Specialty" in which the advertisers announce their desire to manufacture some specialties in connection with their regular line, intimating at the same time that they might be in a position to place good selling articles on the market in addition to manufacturing them. We may add that the parties in question occupy a recognized position in the trade and are probably able to manufacture to advantage such articles as they allude to, having recently increased their facilities.

THE SHARON HARDWARE COMPANY have been organized at Sharon, Pa., with F. B. Test as manager. Mr. Test has been connected with Fruit, Ohl & Co. of Sharon as buyer and manager for 12 years. With close buying and strict attention to business the new company expect a fair measure of success.

ANNOUNCEMENT IS MADE that the corporate name of Munger, Freeman & Co., Detroit, Mich., has been changed to Free-

Cabinets for Price-Lists.

THE PROMINENCE given to the arrangement and care of price-lists by a prominent retail Hardware firm is shown

ferred to, are used for circulars and catalogues, each being put in the hole it fits best, irrespective of the matter it contains; thus goods of the same kind are often represented in several different pigeon holes,

arrangement of the index being shown in Fig. 2. The first space is for the name of the article, the second for the kind, the third contains the letter designating the pigeon hole in which the circular or catalogue is found, while the fourth space is for the name of the dealer or manufacturer. The index book is 10½ x 14 inches, and contains about 200 pages. When first made, blank lines were left under each subject, in order to allow for subsequent catalogues as they might be received. When these spaces become filled the last line refers to a supplementary index found in the last pages of the book. If there is no time found to index the contents of a catalogue or circular at the time of its receipt, it is put in the pigeon hole W, which is marked "not indexed," to remain until it is properly indexed. Frequently little circulars or treatises on goods are saved that would otherwise reach the waste basket. Once indexed and put in the pigeon holes they are of no further trouble, and are not seriously in the way if never used. It often happens, however, that the one least valued is the one most needed. The shelf Z is devoted to large catalogues received from jobbing houses and referred to most frequently, the shelf being the right height from the floor to easily lift the heavy volumes from. Pigeon hole 8 is used for catalogues of less importance; 9 is for promiscuous trade journals, and 10 and 11 for *The Iron Age* and *Metal Worker*. Old catalogues are destroyed when new ones are received from the same firm. The cabinet is referred to as a very convenient receptacle for keeping this portion of the office neat, clean and in order. Then, too, information regarding any article or line of goods can be found quickly. The work of first arranging the circulars and catalogues in the cabinet was laborious, but it requires little time to keep it up.

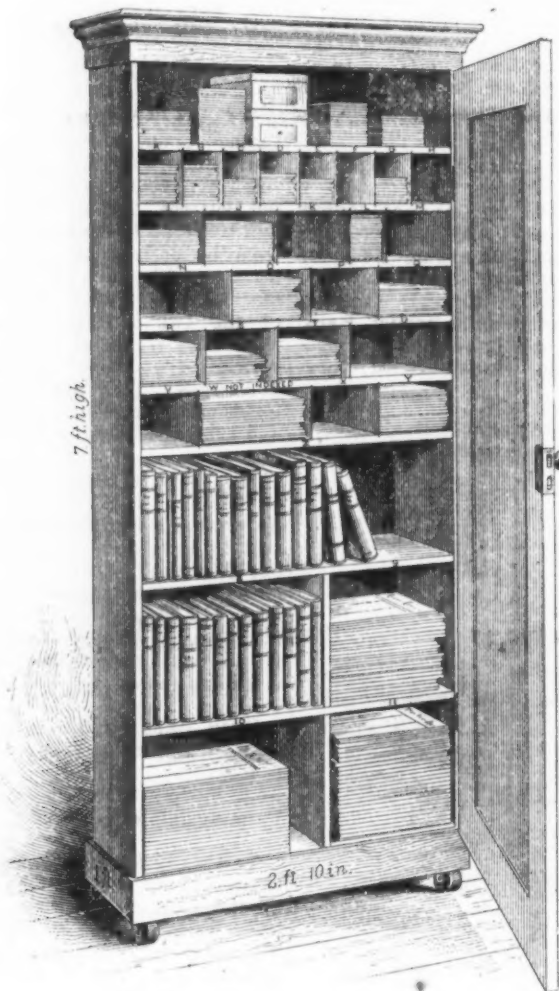


Fig. 1.—Cabinet for Price-Lists, &c.

in the accompanying description and illustration of a cabinet, for which we are indebted to E. I. King & Co., Logan, Kan. The idea is original with them, and the plan is in successful operation in their place of business. The sides and shelves of the cabinet, as shown in Fig. 1, are of ¾-inch lumber, with an ordinary 2-8 x 6-8 panel door for the front, which shuts in flush. The partitions in the shelves are of tin, slipped in kerfs sawed in the shelves before they were put into the cabinet. The cabinet is mounted on wheels, to facilitate moving in case of fire, as they consider that the contents would be of inestimable value in buying a new stock of goods. An index of the price-lists is kept in the safe. In the arrangement of the cabinet the upper shelf is used for keeping surplus office supplies, such as letter and bill heads, &c. The pigeon holes from B to L inclusive are 3¼ inches wide, being a convenient size to receive circulars and catalogues in envelopes. All of the apartments are marked with numbers or letters on the edge of the shelf. The printed matter is usually left in the original envelopes, which have the dealer's or the manufacturer's firm name printed on the outside. The pigeon holes, which occupy five shelves, including those already re-

ferred to, of course, of different makes. Each catalogue or envelope is marked with a gummed letter, as shown herewith, corresponding to the pigeon hole in which it is placed. The contents of these five shelves are indexed in a common record book, ruled to suit the requirements of the case, the ruling and

It Is Reported—

That John W. Reid will enter the Hardware and grocery firm of W. Greening, Hustonville, Ky., January 1, having purchased a half interest.
That Sims, Walkinshaw & Co., Hardware, Stoves, &c., Tonawanda, N. Y., have sold out to B. L. Rand.
That Wenatchee, Wash., offers a good opening for a Hardware store.

Augers.	Fruit.	E	Ridenour-Baker Grocery Co.
"	Post Hole.	K	L. M. Rumsey Mfg. Co.
"	All kinds Well	M	American Well Works.
"	" " "	"	U. S. W. E. & P. Co.
"	Hollow.	P	W. F. & John Barnes.
"	Wood Pump Tubing.	Q	N. O. Nelson Mfg. Co.
Aprons.	Rubber Dash.	K	Goodyear Rubber Co.
Arms.	Towel.	U	Udell Crunden & Co.
"	Fire.	T	Winchester Repeating Arms Co.

Fig. 2.—Copy from Index Book.

That Graham Watts, Honesdale, Pa., has removed his stock of Hardware into his new and elegant brick block.

That J. W. Wheeler, formerly with Hutchinson & Kimball, has bought out the Hardware store of Sanford Winter, Brockton, Mass.

That Velde, Roelfs & Co., Pekin, Ill., have taken possession of their new establishment, which comprises two large and convenient store rooms, 50 x 95 feet.

That Wm. Allen will embark in the Hardware business at Superior, Wis., January 1.

That D. C. & J. W. Marker have bought out the stock of Hardware, Stoves and Implements of C. C. Huddleston, Lamar, Cal.

That \$350 worth of Cutlery and other goods were stolen from F. S. Brown's store at Cockranville, Chester County, Pa., on the morning of the 6th inst.

That Blood & Chapman, dealers in Hardware and Stoves, Pepperell, Mass., are thinking of selling out their business.

That D. Sommer, Elgin, Ore., is erecting a building that he will occupy for a Hardware store when completed.

That Krehbeil & Hertzlo have sold their Hardware store at Mound Ridge, Kan., to Emil Moddemog, who will continue the business.

That F. P. Carruth & Co., Orange, Mass., who were burned out some time since, are again doing business in a very handsome and commodious store, 20 x 100 feet, substantially fitted up.

That John W. Malsed and John Phancoo have formed a copartnership under the firm name of Malsed & Phancoo, for the purpose of carrying on the Hardware business at Millbank, S. D.

That Murphy & Smith, Trenton, Mo., have sold out their Hardware business.

That F. Smock contemplates locating in South Ottumwa, Iowa, to engage in the Hardware business.

That Hatch & Propst have bought out Mrs. A. E. Stewart's Hardware stock at Greenville, Ill.

That W. R. Alford and James Lynch of Emory, Texas, have purchased the Hardware stock of John Baird, Lone Oak, Texas.

That O. F. Strayer of Minneapolis, Minn., has purchased the stock of Hardware belonging to C. H. Fallon, Mercersburg, Pa., and will take possession of the same January 1. Mr. Fallon will devote his time in the future to the handling of Implements and Farm Machinery, which branch of trade he has successfully carried on heretofore in connection with the Hardware business.

That J. A. Bradley & Co., Gladstone, Mich., dealers in Hardware, &c., have sold out to Flora S. Blackwell.

That M. J. & J. L. Beachley, Salisbury, Pa., are erecting a new Hardware establishment, 86 x 26 feet, two stories high. The upper story will contain an opera house and a town hall.

That the old Hardware business of W. M. Jack at Butte, Mont., has been sold to a stock company, comprising M. J. Connell, John A. Coram, W. R. Kenyon, Richard Watson and others. Mr. Jack intends removing to Portland, Ore.

That William Bloedorn's Hardware store at Platte Center, Neb., was broken into by burglars on the night of the 17th inst. Some money and a collection of Knives, Revolvers and Razors were secured. This is the second time within a short period that the store has been robbed.

That Geo. W. Marshall and Edward Cockrane will commence the Hardware business at Ashland, Wis., January 1.

That Leavitt & Stephenson, Hardware dealers at Hartford, Minn., have dissolved partnership.

That the Hardware firm of Snyder & Harper, Mt. Pulaski, Ill., have dissolved partnership. J. J. Snyder will continue the business at the old stand. Mr. Harper is undecided as to his future course.

That the Hardware establishment of W. G. Northcutt, Longview, Texas, was burglarized on the 16th inst. Shotguns and Knives were stolen.

That L. E. Nolan has purchased the Hardware business of Mrs. T. F. Brehoney, Avoca, Pa.

That Glass & McKean have taken possession of their new store at New Kensington, Pa.

That Ole Anderson, Ridgway, Iowa, has sold his entire stock of Saddlery and Hardware to Aga & Butz, who will take possession of it January 1.

That Taft & Co. have succeeded to the business heretofore conducted by A. G. Taft at Mazeppa, Minn.

That Jacob Stahl and A. D. Hensel will open a Hardware store at Lansing, Mich., at an early date.

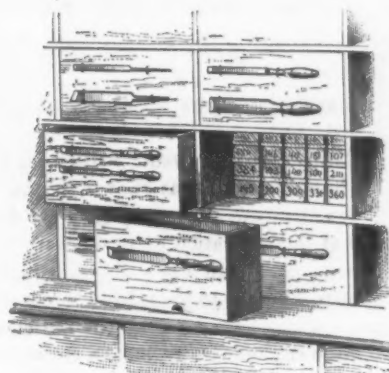
That C. G. Golding's Hardware store at Alvarado, Texas, was entered by burglars on the 17th inst. and \$40 worth of goods stolen.

That M. M. Converse will erect a new Hardware establishment at Wellsboro, Pa.

That the new Hardware store of Stockton & Thomson, Clinton, N. J., will soon be completed.

Keeping Pocket Cutlery from Burglars.

THE FREQUENCY with which Hardware stores are burglarized, and Cutlery being the article most largely stolen, the Geo. Hayden Hardware Company of Jacksonville, Ill., have favored us with their plan for keeping Cutlery in the original packages, where it is not likely to be seen by the intruders. They use a Cutlery case similar to the Campbell's sliding tray, and keep only the samples of



Pocket Cutlery Back of Chisel Boxes.

Pocket Cutlery in the showcase. Chisels are kept directly back of the case in boxes that fit the shelving, with the sample of each size Chisel fastened to the face of the box, as shown in the accompanying cut. The Chisel boxes are 6 inches deep and 18 inches long, while the shelving is 12 inches deep. This leaves a space of 6 inches back of the Chisel boxes, where the stock of Pocket Cutlery is kept in the original boxes. The numbers corresponding to the samples in the case are marked on the end of the Cutlery boxes, in large

figures, with an oil crayon or marking pencil. The smallest numbers are put on the top shelf, with the larger numbers in regular order below, making it an easy matter to find any number desired. They refer to the plan as satisfactory in every respect, and consider it much safer than keeping the entire stock in the case.

Price-Lists, Circulars, &c.

THE WILMOT & HOBBS MFG. COMPANY, Bridgeport, Conn.: Cold-Rolled Strip Steel. The cold rolling of Strip or Sheet Steel is referred to as greatly improving its quality for all kinds of difficult pressed, stamped and drawn work, and as lessening the cost of the manufacture of sheet metal goods, as the expense for repairs or maintenance of tools is materially reduced. It can be had coiled in 100 to 300 feet lengths suitable for feeding into automatic machinery, and sheared to any exact width, or cut to specified lengths.

THE EUREKA SAFE AND LOCK COMPANY, Cincinnati, Ohio: Eureka Fire Proof Safes. The manufacturers describe the Safes as perfectly dry, and explain that the doors have a sufficient number of flanges to make the door fit closely, to make the Safe air-tight and to secure the contents from heated air in case of fire. The Safe has a solid wrought-iron covering, detachable legs, and a combination lock that cannot be opened though the dial and spindle be pulled out. The inside lining is of heavy tinned wrought iron, covered with a neat wood finish.

CHALLENGE CORN PLANTER COMPANY, Grand Haven, Mich., and 106 Chambers street, New York: Challenge Iceberg Refrigerators. Their 1892 catalogue shows several new styles of Refrigerators, as well as their large line improved in many respects. They have added to the appearance of the Refrigerators by trimming them with solid bronze throughout, including the lid hinge. The escutcheons and hinges, as well as the air-tight lock and self-retaining malleable caster, are of their own special design, and are illustrated in their catalogue. Each style of Refrigerator has been materially enlarged without advancing the list price. Reference is made to the improvement made last year in dispensing with all miter joints on the lid and the corners of the base or feet. They bring out this season an entire new line of sideboards, which are referred to as being finished in the finest and most artistic style, with rich and elaborate hand carving and beveled French plate mirrors, the sideboards being adapted to nearly all sizes or styles of family Refrigerators.

HEBBLEWHITE MFG. COMPANY, Buffalo, N. Y.: Climax Specialties, Climax Paste Stove Polish, Climax Cake Stove Polish, Climax Stove Enamel, Climax Paste for Stove Dealers, Climax Dressing, Crescent Dressing, Climax Shoe Blacking, French Shoe Blacking and Royal Insect Destroyer.

THE UNION METALLIC CARTRIDGE COMPANY, Bridgeport, Conn., with agencies at New York and San Francisco, are sending a large metallic end hanger, with calendar sheets for 1892. The hanger is in colors, the principal feature being a boy with cartridge belt, carrying a double-barreled gun. In the background is the hunter with game bag and dog. The calendar sheets are large, and on the back of each are the complete dates for the year. Printed on the hanger, underneath the sheets, are the dates for 1893. The hanger will make an attractive addition to counting rooms or stores.

JOHN P. LOVELL ARMS COMPANY, Boston, Mass., are sending out a metallic end hanger on which are calendar sheets for 1892. The hanger is highly colored and shows at the top their Champion Top Snap and Side Snap Guns. Below these

are pictures of three styles of the Lovell Diamond Cycles. The center of the hanger is devoted to a country road, on which are a lady and gentleman riding Diamond Cycles. Below this are the calendar sheets, on each side of which are shown a variety of sporting goods. The hanger is bright and breezy, and makes an attractive display of their line of goods.

THE NEW PROCESS TWIST DRILL COMPANY, Taunton, Mass., manufacturers of Twist Drills of every description, send an 1892 calendar. A colored picture of Lillian Russell is surrounded by open rustic work, which is covered with snow and icicles. The calendar sheets are suspended by cords from the lower part of the card. The compliments of the company, together with illustrations of Drills, occupy the upper part of the card.

PRATT & LETCHWORTH Buffalo, N. Y., send a calendar for January, 1892. This is similar in size and style to those issued each month during 1891.

WHITE & BALLARD, Washington C. H., Ohio, are sending out an 1892 calendar, in which they call attention to the fact that they have been in business ten years. A feature of the calendar is a hand and arm, which points to any date in a month that may be desired.

P. CARTER, Capouse Works, Scranton, Pa.: Axes and Bark Spuds. Their catalogue shows Axes in a variety of patterns, both single and double bitted. Particular attention is directed to Carter's Hand-Made Black Diamond Axe, as being a superior tool and as giving satisfaction in extremely cold climates. It is stated that no pains are spared in its manufacture, and that every Axe is thoroughly tested and known to be perfect.

PARAGON MFG. COMPANY, New Haven, Conn., and 112 Chambers street, New York: Illustrated price-list. Illustrations are given of Spoke Shaves, Ice Chisels, Pipe Vises, Cast-Iron Hammers, Alligator and Climax Wrenches, Can Openers, Trammel Points, Brush Clamp, Pocket Levels, Metal Knuckles, Revolving Punches, Mail Boxes, Gas Burners, Barlow's Door Spring, &c. The catalogue is attractively printed and well arranged.

RICHARDSON BROS., Newark, N. J.: Saws. A pamphlet of corrected prices on Circular Saws and other Mill Goods, to be attached to their catalogue of January 1, 1891. These corrected prices conform to those made by other Saw manufacturers.

BUHL, SONS & CO., Detroit, Mich.: Price-current, under date January 1, 1892. This is devoted to Steel Goods, Lawn Rakes, Scythes, Cradles, Corn Planters, Post Diggers, Toilet Clippers, Pruning and Hedge Shears, Sheep Shears, Lawn Mowers, Door and Window Screens and other Season Goods.

WM. CABLE EXCELSIOR WIRE MFG. COMPANY, 43 Fulton street, New York, with factories at Brooklyn, N. Y., have issued their calendar for 1892. It is made up of large sheets 15 x 20 inches, held at top by a metallic strip. The dates are large enough to be seen across a good sized office, and will be appreciated for this feature.

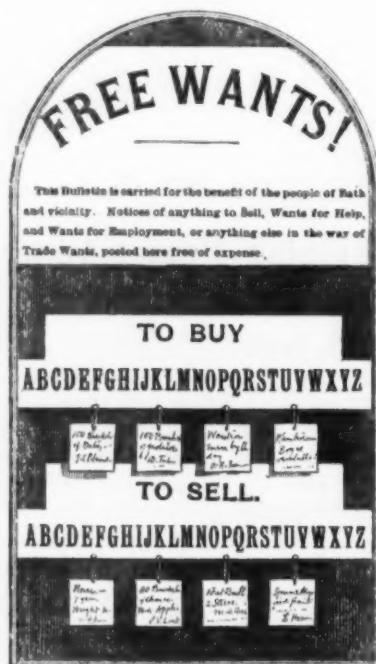
PRUSIA HARDWARE COMPANY, Fort Dodge, Iowa, send out a convenient and tasty calendar for 1892. The background is of tinted card board, on which is the raised picture of a child, whose hat and wrappings have a frosted appearance. The calendar leaves are attached.

AMERICAN CURRY COMB COMPANY, Troy, N. Y., salesroom with Fuller Bros., 33 Chambers street, New York: Catalogue showing the line of goods put on the market by the company, representing the following manufacturers: Sweet & Clark Company, Marion, Ind.; Edward S. Hotchkiss, Bridgeport, Conn.; Southington Cutlery Company, Southington, Conn.; William P. Kellogg, Troy, N. Y., and New York Stamping Company, Brooklyn,

N. Y. The catalogue is attractively printed in red and black and well arranged, illustrations being given of the different Curry Combs with brief description, the prices being left blank. Page 49 is devoted to a table giving the old numbers of the manufacturers and the new numbers under which they are hereafter to be sold.

McNamara's Bulletin Board.

A NOVEL FEATURE, as an attraction and convenience, in a Hardware store has been introduced by John McNamara, Bath, N. Y. This is a free bulletin, as shown in accompanying cut which the proprietor has placed in his store for the convenience of the people of Bath and vicinity, on which persons having things to sell, or those wanting to buy, can post the information. Those wanting help of any kind, from servant girls to farm hands, boys, clerks,



McNamara's Bulletin Board.

or day laborers, are at liberty to use the board.

Cards with the wants written on them are hung on hooks, as shown in the cut. When the cards are put up they are dated, and at the expiration of 15 days are taken down. Although a new thing, it is found to attract people to the store. A few of the many wants advertised on the bulletin are as follows, under "To Sell": Horse, seven years old, weight between ten and eleven hundred. Eighty bushels of choice winter apples. One fat bull, one fat cow and two fat steers. Colt 3½ years old. Under "To Buy": One hundred bushels oats. One hundred bushels potatoes. Wanted, boy at shoe factory. Wanted, boy at Hewlett's furniture store. Wanted, men by the day. To rent house. Wanted, to rent house of four or five rooms. From the foregoing an idea of the scope of the bulletin's usefulness may be had, together with the number of people it would draw to a place of business. We know of no reason why a similar bulletin could not be introduced in other Hardware stores with equal success.

Exports.

PER BARK PHONOGRAPH, DECEMBER 10, 1891, FOR BRISBANE, AUSTRALIA.

By H. W. Peabody & Co.—7 packages Hardware, 3 cases Nails, 9 packages Lawn Mowers.
By Collins & Co.—35 dozen Tools.
By Meriden Britannia Company.—4 boxes Silver-Plated Ware.
By Henry Disston & Sons.—2 cases Hardware.
By R. H. Dana & Co.—16 cases Plated Ware.
By Edward Miller & Co.—81 packages Lamp Goods.
By R. W. Forbes & Son.—4 packages Hardware, 3 cases Picks.
By S. Hoffnagel & Co.—4 cases Guns, 1 case Primers, 3 cases Wringers, 1 case Files, 1 case Saws, 1 case Wrenches, 1 case Snaths, 1 box Lamp Goods, 2 crates Traps, 2 packages Bells, 1 case Braces, 1 case Wrenches.
By Arkell & Douglas.—300 reels Barb Wire, 183 cases Axes, 1 case Scales, 5 cases Picks, 5 cases Bolts, 1 case Wireware, 3 cases Oil Cans, 7 bundles Churns, 1 case Egg Beaters, 3 packages Plated Ware, 4 cases Corn Shellers, 4 cases Tools, 14 cases Choppers, 42 packages Hardware, 4 packages Hardware.

PER BRIG MOTLEY, DECEMBER 11, 1891, FOR DUNEDIN, NEW ZEALAND.

By Hartley & Graham.—5 cases Metallic Cartridges, 6 cases Cartridges, 1 case Empty Cartridge Shells, 1 case Fire Arms, &c.
By W. H. Crossman & Bro.—13 cases Hardware, 1 case Hatchets, 1 case Vises.
By A. S. Lascelles & Co.—12 packages Lampware.
By H. W. Peabody & Co.—18 cases Nails, 12 crates Step Ladders, 6 cases Wringers, 9 cases Hardware, 1 case Nails, 10 cases Horse Nails, 1 case Egg Beaters, 1 case Mouse Traps, 4 cases Wringers, 2 cases Pumps, 19 packages Hardware, 1 case Fire Arms, 1 box Cartridges, 7 packages Lampware, 5 cases Horse Nails, 1 case Wringer parts, 1 case Egg Beaters, 5 packages Spades, 1 bundle Potato Hooks, 1 case Plated Ware, 55 packages Lampware, 10 cases Tools, 94 pounds Wagon Springs, 17 packages Hardware, 1 case Rubber Hose, 2 cases Pumps, 15 packages Hardware, 1 case Bolts, 1 case Silver-Plated Ware, 1 case Egg Beaters, 14 cases Tools, 1 case Cutlery, 10 packages Lampware, 1 case Drills, ½ barrel Lampware.
By R. W. Cameron & Co.—1 case Lemon Squeezers, 2 cases Coffee Mills, 5 cases Lawn Mowers, 7 packages Sad Irons, 1 box Emery Wheels.

FOR AUCKLAND.

By R. W. Forbes & Son.—10 cases Nails, 1 case Hames, 21 packages Hardware, 4 packages Nuts, &c., 14 cases Wringers, 91 cases Axes, 5 boxes Scales, 120 dozen Axe Handles.
By W. H. Crossman & Bro.—2 cases Hardware.
By F. B. Wheeler & Co.—6 cases Hardware.
By A. S. Lascelles & Co.—3 dozen Axes, 8 dozen Stones, 1 case Hardware, 2 cases Lampware, 3 racks Churns.
By H. W. Peabody & Co.—25 packages Hardware, 6 cases Horse Nails, 2 cases Wringers, 21 packages Lampware, 2 cases Traps, 10 packages Lawn Mowers, 6 packages Hardware, 6 packages Lampware, 1 bale Cordage, 3 cases Wringers, 1 case Primers, 4 cases Wringer Parts, 16 packages Hardware, 1 case Wireware, 1 case Whetstones, 2 packages Hardware, 2 boxes Nails, 72 cases Hardware, 2 packages Lawn Mowers.

PER SHIP ELWELL, DECEMBER 16, 1891, FOR SYDNEY, N. S. W.

By Atlas Tack Corporation.—12 cases Nails.
By Manhattan Brass Company.—1 case Brass Goods.
By Hsley, Doubleday & Co.—26 cases Axe Handles.
By Simpson, Hall, Miller & Co.—19 packages Plated Ware.
By Russell & Erwin Mfg. Company.—14 cases Hardware.
By Collins & Co.—170 dozen Axes.
By McLean Bros. & Rigg.—23 cases Plows.
By Sargent & Co.—4 cases Hardware.
By William E. Peck.—52 cases Plated Ware.
By Edward Miller & Co.—170 packages Lamp Goods.
By Henry Disston & Sons.—13 cases Hardware.
By Manhattan Brass Company.—3 cases Brass Goods.
By W. K. Freeman.—4 cases Wood Hames, 12 boxes Iron Bolts.
By W. H. Crossman & Bro.—3 packages Pump parts, 4 cases Corn Mills 24 crates Churns, 8 cases Wringers, 1 case Wire Cloth, 141 cases Axes, 3 cases Scales, 78 packages Hardware.
By Strong & Trowbridge.—4 cases Hardware.

By Henry W. Peabody & Co.—1 case Hardware, 3 packages Hardware, 1 bale Wagon Springs, 1 case Tacks, 1 case Bolts, 1 barrel Wagon Jacks, 3 packages Hardware.

FOR NEWCASTLE.

By H. W. Peabody & Co.—6 reels Barb Wire, 21 cases Tools.

By W. H. Crossman & Bro.—6 boxes Axes, 1 dozen Stepladders, 1 case Wrenches, 8 cases Hardware, 6 cases Hardware.

By Strong & Trowbridge.—7 packages Lampware, 2 cases Wringers, 6 cases Lawn Mowers, 3 crates Corn Shellers, 7 packages Lampware, 2 cases Meat Choppers.

FOR SYDNEY.

By A. & M. Hayden.—8 cases Bolts.

By W. K. Freeman.—3 cases Iron Nuts and Bolts.

By B. F. Avery & Sons.—9 boxes Flows.

By S. Hoffnung & Co.—2 cases Hardware, 15 cases Axes, 69 cases Axes and Bush Hooks, 2 cases Nail Pullers, 1 case Rifles, 40 cases Nails, 2 cases Pencils, 2 cases Hammers, 2 cases Traps, 3 cases Wrenches, 110 kegs Staples, 2 barrels Hoes, 1 case Thermometers, 36 packages Lamp Goods, 10 cases Hardware, 18 dozen Scissors, 8 dozen Grindstone Fixtures, 3 cases Wrenches, 24 cases Tinware, 5 barrels Twine, 90 dozen Axes, 1 case Sieves, 59 cases Fire Arms.

By H. H. Moore.—23 cases Axes, 6 cases Picks, 11 packages Hardware, 2 packages Lamp Goods.

By Australasian-American Shipping Company.—5 cases Nuts and Bolts.

By Arkell & Douglas.—5 cases Picks, 10 cases Bush Hooks, 12 cases Stamped Ware, 27 cases Scales, 4 cases Wireware, 17 packages Hardware, 24 packages Lampware, 24 cases Wringers, 294 dozen Axes, 87 packages Grindstone Fixtures, 42 packages Agricultural Implements, 28 cases Tools, 28 cases Cartridges, 25 cases Guns and Cartridges, 87 packages Nails, 95 packages Hardware, 3 cases Bolts.

PER BARK GALATEA, DECEMBER 22, 1891,
FOR SYDNEY, N. S. W.

By W. K. Freeman.—2 cases Hardware, 7 packages Scales, 3 cases and 14 boxes Hardware, 1 case Buck Saws.

By Winchester Repeating Arms Company.—3 cases Guns, 10,000 Empty Shells.

By Hartley & Graham.—22 cases Cartridges, 1 case Fire Arms.

By Winchester Repeating Arms Company.—10 cases Percussion Caps, 9 cases Guns, 2 cases Tools, 1 case Empty Shells.

By John A. Gifford.—2 packages Hardware.

By Hartley & Graham.—20 Rifles, 1 case Fire Arms, &c., 2 cases Cartridges, 1 case Fire Arms.

By W. & B. Douglas.—2 packages Pumps.

By Edward Miller & Co.—8 boxes, 9 barrels and 2 cases Lamp Goods.

By Healy & Earl.—8 packages Saws.

By E. W. Harrison.—3 boxes Pumps, 1 box Hardware, 1 box Drills.

By V. Basanta.—1 case Augers, 1 case Clamps, 2 cases Planes, Mattocks, &c., 1 package Axes, 1 case Saws, &c.

By J. F. McCoy & Co.—5 cases Guns, 3 cases Tools, 1 case Primers, 11 cases Empty Shells.

By Edward Miller & Co.—10 packages Lamp Goods.

By Alfred Cheney & Co.—9 barrels Wire.

By R. H. Dana & Co.—50 cases Handled Axes, 1 case Emery Wheels, 1 case Hammers, 1 case Bolt Clippers, 1 case Drills, 1 case Bolt Clippers, 1 case Snaths.

By A. S. Lascelles & Co.—20 cases Axes, 1 case Locks, 8 cases Hardware, 1 barrel Braces, 1 case Knives, 1 case Fire Arms.

By R. W. Cameron & Co.—1 case Iron Pumps, 2 cases Lampware.

By F. & J. Meyer.—1 case Hay Knives, 1 case Saws, 2 cases Hardware, 1 case Cow Bells, 3 cases Hardware.

By Strong & Trowbridge.—15 packages Lamps and Fixtures, 1 case Braces, 4 packages Hardware, 41 cases Hardware, 1 case Hardware, 1 case Rivets.

By H. W. Peabody & Co.—6 cases Nails, 6 cases Tacks, 1 barrel Hardware, 6 cases Jacks, 45 packages Hardware, 34 cases Cartridges, 1 case Revolvers, 5 cases Iron Washers, 1 case Hardware, 9 cases Cartridges, 2 cases Sandpaper, 4 packages Hardware, 1 case Hardware.

By McLean Bros. & Ricq.—3 sets Sad Irons, 24 cases Guns, 4 cases Forges, 30 cases Cartridges, 7 cases Hatchets, 9 cases Sad Irons, 1 case Tacks, 1 rack Churns, 2 cases Bird Cages, 2 barrels Lamps, 2 cases Miter Boxes, 2 cases Boring Machines, 20 packages Lawn Mowers, 1 case Safety Razors, 3 cases Corn Planters, 1 case Locks, 3 cases Hardware, 1 case Staples.

By R. W. Forbes & Son.—1 case Emery Wheels, 15 dozen Tools.

Paints and Colors.

It should be understood that the prices quoted in this column are strictly those current in the wholesale market, and that higher prices are paid for retail lots. The quality of goods frequently necessitates a considerable range of prices.

Of uneventful weeks in the market for Paints and Colors, the one just ended that winds up business affairs of the year will compare with any that has been experienced during the past 12 months. Business, as a matter of fact, has been almost at a standstill. The only relief was in the receipt of out-of-town orders for moderate quantities of the more staple lines of goods for immediate delivery and the closing of some contracts for grinders' goods for delivery during the next three months. Values have undergone no change whatever, and there is nothing in the present movement of manufactured goods or in the condition of the market for base materials that would foreshadow fluctuation of important character in the near future.

White Lead.—For corrodors' product there has been little or nothing more than a jobbing demand of slender proportions. Neither wholesale nor retail distributors have placed orders for supplies for delivery ahead, and the consumptive demand seems to have run lighter than usual for the season. Experience with the various cheaper products in the form of Mixed Leads has been very similar, the better class of the same used for house painting having had a very limited sale, while orders for the cheaper sorts employed in oil cloth and curtain manufacture are as yet of moderate proportions. In the condition of the market for base materials, nothing has occurred having a tendency to affect values of the pigment.

Red Lead and Litharge.—Red Lead has been practically neglected, and the market is devoid of new feature. On Litharge practically the same report is to be made, since few contracts have been made for the varieties used by glass manufacturers, while purchases of the finer grades amount to scarcely anything outside of routine retail quantities.

Zincs.—American manufacturers have booked very fair orders for outside. Some agents state that the supply of the lower grades at their command, available for delivery two or three months ahead, is all placed, and that advance orders for the better qualities are quite satisfactory. There is no sign of friction in any quarter and former prices are firmly adhered to. Foreign product is without change in price, and finds limited sale at the moment.

Colors.—Dry Colors adapted for grinders' use are selling to some extent for near future delivery, with Blues, Browns and Reds faring relatively the best, but orders do not involve remarkably large quantities, and prices are somewhat variable. Colors for house painters' use are very quiet, as are also Oil Colors in general, and the movement of Mixed Paints is momentarily on a rather small scale.

Miscellaneous.—Block Chalk to arrive by sail vessel is quoted at \$1.75 bid, \$1.90 upward asked, with little business passing. Spot parcels are neglected. Whiting and Paris White are steady at old prices, but in limited demand. Putty is unchanged in price and moving off slowly. Barytes, China Clay, Terra Alba and Talc remain very quiet and without change.

Oils and Turpentine.

Except that prices for Cotton Seed products have ruled somewhat lower, there is no special feature to report for the week. In other lines values have re-

mained stationary and business throughout has been on strictly routine lines. As matters stand there is no incentive for buyers to deviate from strictly conservative policy, and at present low prices sellers seem disinclined to offer any special inducements. Hence business shows more than customary dullness for the season, and in nearly all branches of the trade the disposition is to hold back for developments that would prompt positive action on the part of either buyers or sellers. Very few and only unimportant changes in values is to be recorded for the week under review.

Linseed Oil.—Neither local nor out-of-town manufacturers have engaged in any new maneuvers. The few tests made seem to satisfy both interests that nothing short of sacrifice prices will induce buyers to place orders for supplies for delivery any considerable time ahead, and, in the absence of any sign of differences between the conflicting interests being healed, or of values moving on the up grade, buyers are still very indifferent. Business, as a matter of course, is on a limited scale. As to the future of the market for raw material, uncertainty is as conspicuous as it has been at any previous time this year. Opinions as to future export business in seed are variable, and, while the extent of the supply is uncertain, as usual, the indications are that, without liberal export outlet, prices for future deliveries will decline.

Cotton-Seed Oils.—The market has been very quiet and prices are somewhat lower all along the line. Reports from the South are to the effect that considerable sales are making there of Oil for shipment direct to large Western consumers and the arrivals at this point (New York) are moderate. Despite these facts both crude and refined Oil is offered for prompt and near future delivery here at prices somewhat below those at which sales were made a week ago without stimulating purchases. Crude has been sold here to the extent of about 700 barrels at 25¢ @ 25½¢ for prime, and 23¢ for off grade. Of prime Summer Yellow moderate-sized lots were let go at 29¢, and for delivery a short time ahead 28½¢ has been quoted, with indifferent result. The decline in prices of cotton, due chiefly to large supply of the staple, leads to the impression that the stock of seed as well as of cotton is in excess of late estimates, and that the output of Oil will be unusually heavy this year.

Lard Oil.—For city brands there has been a good steady demand and pressers have disposed of their output at prices on the basis of 54¢ for prime quality. Out of town brands of similar quality have moved at about the same figures, in very fair quantity. Some holders are now quoting 55¢, and while that price is exceptionally high on transactions involving larger quantities than single barrels, the market is unmistakably firm.

Fish Oils.—There is no change whatever in the market for crude Sperm, Whale or Menhaden Oils, and no important transactions have taken place. The manufactured products are firmly held at old prices, but selling in a routine jobbing way only. Cod Oil is still scarce and very firmly held at full former prices.

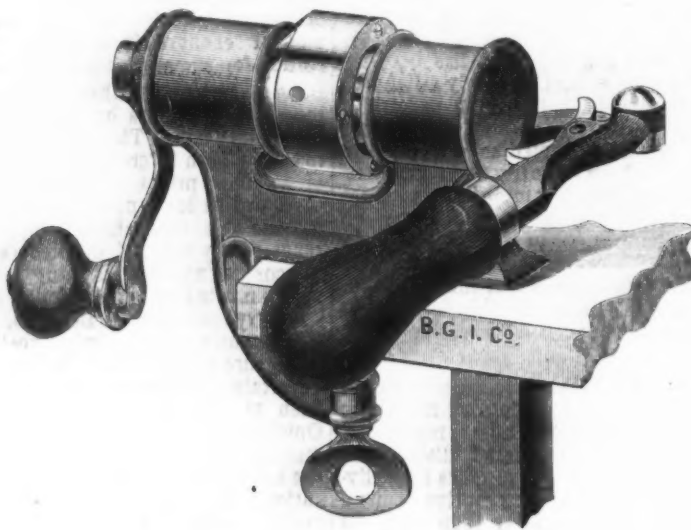
Miscellaneous.—Ceylon Coconut Oil has been sold to a fair extent at 5½¢ @ 5½¢ on the spot, and 5½¢ @ 5½¢ for future shipments from primary points, showing a barely steady market. Olive Oil in barrels is moving at 62¢ @ 64¢ on the spot and 58¢ @ 60¢ to arrive, but rather slowly.

Spirits Turpentine.—The demand has shown little improvement, if any, but supplies are not as urgently offered as they were a week ago, and prices are firmer at about 1¢ @ 1½¢ gallon advance from the lowest point.

Handy Closer.

The Bridgeport Gun Implement Company, Bridgeport, Conn., and 315 Broadway, New York, are introducing this article, as illustrated herewith. It has a straight-feed lever and patent expansive follower, which adapts itself to any thickness of paper shell, and, in crimping, exerts a uniform and equal pressure upon the wads, irrespective of the weight of the

wire is coiled. In the projecting rim of this side are notches which engage the wire. The hanger is screwed to the left side of the picture frame, setting the screw down so that the hanger will turn freely. The loose end of the wire is attached to a screw eye in the other side of the frame. The hanger is then turned until the picture is raised to the desired position, when the wire is dropped into one of the notches. The hanger is sold with 8 feet of picture

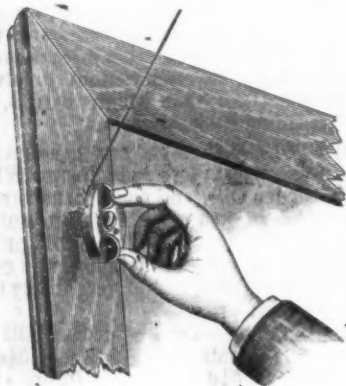


Handy Closer.

charge. This follower virtually restores the interior surface of the shell, burnishing the broken texture of the paper, and produces the cleanest crimp possible. By reversing the hardened steel pins, either a round or square crimp can be made, one end of the pins being curved and the other end flat, making the wearing parts of this closer very durable. The closer is especially designed to meet the demand for a smooth, even crimper, giving uniform pressure on the wads, so absolutely essential when loading nitro powders. It is made 10, 12 and 16 gauge, in three styles, solid brass nickel-plated cup, solid steel cup, and solid steel cup with fly wheel for foot or hand power.

The Billings Adjustable Picture Hanger.

Chas. E. Carpenter, 91 Chambers street, New York, as selling agent, is introducing this article, as illustrated herewith. It consists of a cast-iron disk 1½ inches in



The Billings Adjustable Picture Hanger.

diameter with a screw hole in the center, to one side of which is a smaller hole to receive one end of the picture wire. On the outer surface are two lugs by which to turn the hanger. From the center of the reverse side is a small cylinder through which the screw passes and on which the

wire attached, as sufficient to hang a picture in any room. The point is made that when the hanger is once attached to a picture it is permanent, and that it obviates the necessity of twisting and untwisting the wire in a screw eye several times before the desired result is obtained. They are specially adapted to hanging heavy pictures where a separate wire is used on each side, as then two hangers may be used and the picture easily leveled.

Steady Door Stop.

C. T. Williamson Wire Novelty Company, Newark, N. J., are introducing this article, as illustrated herewith. It is covered by a recent patent. It is made of steel wire nickel plated, with a screw end



Steady Door Stop.

ready to screw into the base board, the other end being provided with a rubber tip for the protection of the door. In construction two pieces of fine steel wire are twisted together in a neat and true manner with a spiral shoulder at each end. The shoulder next the base board forms a side brace and central support to keep the stop in a firm and rigid position. The other spiral shoulder forms a foundation or brace for the rubber tip. The point is made that the formation and finish of the stop offer but little surface or opportunity for dust or dirt to lodge on, thus always presenting a clean and tidy appearance.

H. W. Johns Mfg. Company, New York, are furnishing an asbestos drop curtain for the new Columbia Theater of this city. The utility of an asbestos curtain in case of fire was recently demonstrated at the Haverhill Opera House, Boston. The scenery took fire from a border light, and almost instantaneously the entire contents

of the stage were in flames. The asbestos curtain was dropped and the audience were notified that there was no danger. The presence of the curtain avoided a panic, and lives were doubtless saved thereby.

The Kelley Adjustable Screen Door Frame.

The W. J. Kelley Company, Greenville, Ohio, are offering the trade this article, as shown in the accompanying illustration. The frame is made ¾ inch or 1½ inches in thickness, and is 8 feet 6 inches high, and can be cut down to any desired height by cutting it off at the top and boring two ⅝ inch holes in the frame on each inner side. The frame can now be sprung apart



The Kelley Adjustable Screen Door Frame.

sufficiently to let the dowel pins enter the holes. This can be done without injury to the mortise. The dowel pins are ⅝ inch and made of hard wood. They can be glued in, or a ¾ inch barbed wire roofing nail driven through them will do as well, and will be hidden by the molding. The sides are made 4 inches wide, so they can be dressed down 1 inch off each side, so that a door 3 feet wide will fit anything down to 2 feet 10 inches; a 2 foot 10 inch

door down to 2 feet 8 inches, &c. There are four sizes made—2 feet 6 inches, 2 feet 8 inches, 2 feet 10 inches and 3 feet—to provide for any size opening.

The Gurney Refrigerator Company.

The Gurney Refrigerator Company of Fond du Lac, Wis., occupy the plant which at one time was used by the La Belle Wagon Works. This is a very complete wood-working establishment, built of brick and stone, equipped with a 200 horse-power Corliss engine, heated by steam and lighted by electricity. The company claim that it is the largest and most complete factory for the exclusive manufacture of refrigerators in the world. The facilities possessed by the company and their location in the immediate vicinity of a good supply of hard wood enable them to handle a very large trade in this line of goods and of the very best

character. The circulars and catalogue issued by the company show that the refrigerator which they manufacture possesses special features. It has a removable galvanized iron ice compartment. This is a receptacle for ice and at the same time aids in the circulation of the air. The upper part of the compartment is perforated, so that a continuous circulation of air is provided for. It can easily be taken out and cleaned at any time, hence it possesses advantages in this respect over the usual ice chamber. Even if a hole should be broken in it by an ice pick it would not be injured, as the walls are purposely perforated with holes for the admission of air to the ice. By the peculiar location of this ice compartment in the refrigerator the air does not pass up and down through small flues, but through both ends, the back and the front. In this way the whole interior of the refrigerator, according to the theory of the manufacturers, partakes of the same temperature as the ice. The refrigerator has five walls: First, an outside case of ash panel work; second, a heavy packing of mineral wool; third, a wall of inodorous rosin-sized paper made especially for this work; fourth, a wall of mortised lumber; fifth, a wall of zinc, soldered perfectly air and water-tight. The catalogue issued by this company gives illustrations of the removable ice compartment, a sectional view showing the construction of the ice box and a portion of the ice compartment; a sectional view showing the location of the drip pipe, and a number of views of the Gurney household refrigerator in different styles; several sideboard refrigerators of handsome patterns, and ice chests, restaurant refrigerators, hotel refrigerators, &c.

The Irwin Double-Cutter Auger Bit.

The Irwin Auger Bit Company, Wilmington, Ohio, are introducing the above article, as illustrated herewith. It is simi-

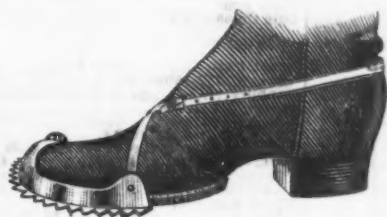


The Irwin Double-Cutter Auger Bit.

lar in all respects to the solid center stem bit manufactured by them, except it has two cutters instead of one. The particular advantage of the Irwin bit is its strength, as the solid shank runs the entire length of the bit, and is larger than in other styles of bits. The screw for removing the chips is sloping, so as to avoid wood clogging in the hole. It is the design of the company to pack their double-cutter bits in their cylinder case, a description of which was recently given in our columns.

The Lawrence Coasting Guard.

The Copeland Hardware Mfg. Company, Worcester, Mass., are offering this article, as illustrated herewith. The guard is made



The Lawrence Coasting Guard.

of malleable steel, and can be fitted to any foot; it is held in place by being strapped over the instep, as shown in the cut. It is designed as a protection for

the boot or shoe of a coaster when steering either a sled or toboggan, giving the operator perfect control over the sled, and preventing the usual wear on the shoe from the friction on the ice or snow.

Victor Toe Calk.

The Victor Toe Calk Company, 22 Pitts street, Boston, Mass., are introducing the toe calk shown in the accompanying



Victor Toe Calk.

illustration. The calk is made by cutting bars of toe-calk steel into lengths required for the different sizes of calks, making a round or square hole $\frac{3}{8}$ to $\frac{1}{2}$ inch deep in the under side, preferably by drilling, and then driving a stiff steel spur into the hole. It is claimed that a higher grade of steel can be used by this method than where the calk is sheared to make the spur; that these spurs never bend or break, and that the shoes never break, as in cases where larger spurs are driven into them.

NEW PUBLICATIONS.

THE MENOMINEE IRON RANGE. Its cities, their industries and resources. By Walter R. Nursey, Iron Mountain, Mich. With maps and illustrations; 150 pages; 8 vo; price 60 cents per copy in limp covers; \$1.10 per copy cloth bound.

This volume is a popular presentation of the more important facts in connection with the development of the Menominee iron range in Michigan and Wisconsin. The subject is treated in a most attractive

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Clamps—

R. I. Tool Co.'s Wrought Iron.....25¢
Adjustable, Cincinnati.....15¢10¢
Adjustable, Cincinnati.....15¢
Adjustable, Stearn's.....30¢30¢10¢
Stearns' Adjustable Cabinet and Corner
Cabinet, Sargent's.....30¢30¢10¢
Carriage Makers', Sargent's.....70¢10¢
Carriage Makers', P. S. & W. Co. 40¢10¢
Eberhard Mfg. Co.....40¢30¢10¢
Warner's.....40¢10¢40¢10¢5¢
Saw Clamps, see Vices, Saw Filers'
Carpenters', Cincinnati.....25¢10¢

Cleavers.

Butchers'.
Bradley's.....25¢30¢
L. & J. White.....20¢5¢
Beatty's.....40¢40¢5¢
New Haven Edge Tool Co.'s.....40¢
P. S. & W.....30¢25¢30¢40¢10¢
Foster Bros.....30¢
Schulte, Lohoff & Co.....40¢40¢5¢

Clips—

Norway, Axle, 1/4 & 5-16.....55¢55¢5¢
Standard Norway Axle, 1/4 & 5-16.....65¢5¢
Superior Axle Clips.....60¢45¢70¢
Norway Spring Bar Clips, 5-16.....55¢5¢
Wrought-Iron Felloe Clips.....5¢
Steel Felloe Clips.....5¢
Baker Axle Clips.....25¢

Cloth and Netting, Wire—See Wire, &c.**Cockeyes.....50¢****Cocks, Brass.....50¢25¢**

Hardware list.....50¢25¢

Coffee Mills—See Mills, Coffee**Collars, Dog, &c.**

Medford Fancy Goods Co.....40¢10¢
Embossed, Gilt, Pope & Steven's list.....30¢10¢
Leather, Pope & Steven's list.....40¢
Brass, Pope & Steven's list.....40¢
Chapman Mfg. Company.....50¢10¢60¢

Combs, Curry.

Fitch's.....50¢10¢50¢10¢10¢
Rubber, per doz \$10.00.....30¢
American Curry Comb Co., New prices
in preparation.

Compasses, Dividers, &c.—

Compasses, Callipers, Dividers, 70¢70¢10¢
Bemis & Call Co.'s
Dividers.....60¢5¢
Compasses & Callipers.....50¢5¢
Wing and Inside or Outside.....50¢5¢
Double.....30¢
(Call's Pat. Inside).....30¢
Excelsior.....50¢
J. Stevens & Co.'s.....25¢10¢
Starratt's
Spring Callipers and Dividers.....25¢10¢
Lock Callipers and Dividers.....25¢
Combination Dividers.....25¢

Coopers' Tools—See Tools, Coopers'.**Cord—**

Sash.
Common.....5¢, 10¢ @ 11¢
Patent, good quality.....5¢, 12¢ @ 12¢
White Cotton Braided, fair.....24¢ @ 25¢
Common Russia Sash.....5¢, 12¢ @ 13¢
Patent Russia Sash.....5¢, 14¢
Cable Laid Italian Sash.....5¢, 21¢ @ 22¢
India Cable Laid Sash.....5¢, 12¢
Silver Lase—
A Quality, White, 50¢.....25¢
A Quality, Drab, 50¢.....25¢
B Quality, White, 30¢.....10¢
B Quality, Drab, 30¢.....10¢
Sylvan Spring, Extra Braided White, 24¢
Sylvan Spring, Extra Braided, Drab, 24¢
Semper Idem, Braided, White.....80¢
Egyptian, India Hemp, Braided.....25¢
Massachusetts, White.....25¢
Samson—
Braided, White Cotton, 50¢.....30¢30¢5¢
Braided, Drab Cotton, 50¢.....30¢30¢5¢
Braided, Italian Hemp, 50¢.....30¢30¢5¢
Braided, Linen, 80¢.....30¢30¢5¢
Tate's Cotton Braided, White, 5¢.....28¢10¢
Wire Picture.
Braided or Twisted.....75¢10¢
Corkscrews—See Screws, Cork.
Cork Knives and Cutters—See
Knives, Cork.
Crackers, Nut—
Table (H. & B. Mfg. Co.).....40¢
Blake's Pattern.....5¢ dos \$2.00, 10¢
Turner & Seymour Mfg. Co.....60¢
Cradles—
Grain.....50¢55¢20¢50¢10¢25¢
Crayons.
White Crayons, 7 gross.....10¢
D. M. Stewart Mfg. Co., Meta Work—
ers, 7 gr, \$2.50.....25¢
D. M. Stewart Mfg. Co., Rolling Mill,
7 gr, \$2.50.....25¢
See also Chalk.
Crew Bars—See Bars, Crew.
Curry Combs—See Combs, Curry.
Curtain Pins—See Pins, Curtain.
Cutters—
Meat.
Dixon's 7 dos.....40¢5¢
Nos.....1 2 3 4 5
\$14.00 \$17.00 \$19.00 \$20.00
Woodruff's 7 dos.....40¢5¢
Nos.....100 150
\$15.00 \$18.00
Hales Pattern 7 dos.....70¢70¢5¢
Nos.....\$27.00 \$33.00 \$45.00
American.....30¢
Nos.....1 2 3 4 5
Each.....\$5 \$7 \$10 \$25 \$50 \$80
Enterprise.....30¢
Nos.....10 12 25 35 45
Each.....\$3 \$2.50 \$4 \$5 \$12
Great American Meat Cutter.....\$45.00
Nos.....112 116 118 120 122
Each.....\$3.00 \$2.75 \$3.00 \$2.50 \$4.00
Miles' Challenge 7 dos.....45¢45¢10¢
Nos.....1 2 3
\$22.00 \$30.00 \$40.00
Home No.....5¢ dos \$20.00, \$5¢10¢

Draw Cut, each:

Nos. 5 2 6 8.....20¢25¢
\$50 \$75 \$80 \$225.....20¢25¢
Beef Shavers (Enterprise).....30¢10¢30¢
Little Giant (P. S. & W. Co.).....50¢
Chadborn's Smoked Beef Cutter, 7 dos
\$66.00

Tobacco.

Champion.....20¢10¢30¢
Wood Bottom.....5¢ dos \$5.00 @ \$5.25
All Iron.....5¢ dos \$4.25
Nashua Lock Co.'s.....5¢ dos \$12.00 50¢55¢
Wilson's.....55¢
Sargents's.....5¢ dos \$24, 55¢10¢
Acme.....5¢ dos \$30.00, 40¢

Washer.

Smith's Pat. 7 dos \$12.00, 20¢10¢10¢
Johnson's.....5¢ dos \$11.00, 33¢5¢
Penny's 7 dos \$14; Jap'd, \$16.00, 55¢
Appleton's.....5¢ dos \$16.00, 60¢10¢
Bonney's.....5¢ dos \$16.00, 60¢10¢
Cincinnati.....25¢10¢

Dampers, &c—

Dampers, Buffalo.....40¢10¢
Buffalo Damper Clips.....40¢10¢
Crown Damper.....40¢
Excelsior.....40¢10¢

Diggers, Post Hole, &c.—

Samson Post Hole Digger, 7 dos \$36.00, 25¢
Fletcher Post Hole Auger, 7 dos \$36, 25¢
Eureka Diggers.....5¢ dos \$12.50 @ \$14.00
Lead's.....5¢ dos \$8.00 @ \$9.00
Vaughan's Post Hole Auger, 7 dos
\$13.00 @ \$14.00
Kohler's Little Giant.....5¢ dos \$18.00
Kohler's Hercules.....5¢ dos \$17.50
Kohler's New Champion.....5¢ dos \$9.00
Schmidler.....5¢ dos \$18.00
Ryan's Post Hole Diggers.....5¢ dos \$24.00
Cronk's Post Bars, 7 dos \$60.00, 50¢55¢
Gibbs Post Hole Digger, 7 dos \$30.00, 50¢
Imperial, 7 dos \$15.....45¢

Dividers—

See Compasses.

Dog Collars—See Collars, Dog, &c.**Door Springs—See Springs, Door.****Drawers.**

Money, 7 dos.....\$18¢23¢

Drawing Knives—See Knives, Drawing.**Drills and Drill Stocks—**

Blacksmiths'.....each \$1.75
Blacksmiths' Self-Feeding, each \$7.50, 20¢
Breast, P. S. & W.....40¢10¢
Breast, Wilson's.....30¢5¢
Breast, Millers Falls.....each \$5.00, 25¢
Breast, Bartholomew's.....each \$2.50, 25¢10¢40¢
Ratchet, Merrill's.....30¢20¢5¢
Ratchet, Ingersoll's.....25¢
Ratchet, Parker's.....30¢20¢5¢
Ratchet, Whitney's.....30¢10¢
Ratchet, Weston's.....30¢25¢
Ratchet, Moore's Triple Action.....30¢5¢
Ratchet, Curtis & Curtis.....30¢
Whitney's Hand Drill, Plain, \$11.00,
Adjustable, \$12.00.....30¢10¢
Wilson's Drill Stocks.....10¢
Automatic Boring Tools.....\$1.75 @ \$1.85
Twist Drills—
Morse.....50¢10¢5¢
Standard.....50¢10¢5¢
Syracuse (Metal list).....50¢10¢
Cleveland.....50¢10¢5¢
Williams.....50¢10¢5¢
New Process.....50¢10¢5¢
Grubbs' Pat. Groove Shank 50¢10¢5¢
Diamond, W. & B.....50¢10¢5¢

Drill Bits or Bit Stock Drills—

See Augers and Bits.

Drill Chucks—See Chucks.**Dripping Pans—See Pans, Dripping.****Drivers, Screw.**

Douglas Mfg. Co.....30¢30¢10¢
Dixon's.....50¢
Buck Bros.....30¢
Stanley R. & L. Co.'s
Varnished Handles.....55¢10¢
Black Handles.....60¢10¢
Sargent & Co.'s
No. 1 Forged Blade.....60¢10¢10¢
Nos. 20, 30 and 60.....60¢10¢10¢
P. S. & W.....70¢
Knapp & Cowles
No. 1.....60¢10¢70¢
No. 2.....60¢10¢10¢70¢5¢
No. 8.....60¢5¢60¢10¢
Nos. 4 and 00, Acme and Ideal.....50¢
Stearns'.....50¢50¢10¢5¢
Gay & Parsons.....35¢
Champion.....35¢10¢
Clark's Pat.....30¢33¢
Crawford's Adjustable.....30¢
Ellrich's Socket and Ratchet.....35¢35¢10¢
Allard's Spiral, new list.....25¢
Koll's Common Sense 7 dos \$6.00, 35¢10¢
Syracuse Screw-Driver Bits.....30¢30¢5¢
Screw-Driver Bits.....5¢ dos 50¢75¢
Screw-Driver Bits, Parr's.....5¢ gr 60¢
Fray's Hol. Hdl. Sets, No. 3, \$12.00,
\$25¢35¢10¢
P. D. & Co.'s all Steel.....50¢
Cincinnati.....35¢10¢
Brace Screw Drivers.....35¢10¢
Buck Bros' Screw-Driver Bits.....

Egg Beaters—See Beaters, Egg.**Egg Poachers—See Poachers, Egg.****Electric Bell Sets—See Bells, Electric.****Emery.—No. 4 to No. 54 to Flour, CP.**

Keys, 7 dos \$4.50, 5¢
1/2 keys, 7 dos \$4.50, 5¢
1/4 keys, 7 dos \$4.50, 5¢
10-b cans, 10
In case.....6¢ 5¢
10-b cans, less
than 10.....10¢ 10¢

Enamelled and Tinned Ware—

See Ware, Hollow.

Escutcheon Pins—See Pins, Escutcheon.**Escutcheons.**

Door Lock.....Same dia as Door Locks.
Brass Thread.....60¢60¢10¢
Wood.....35¢

Expanded Metal.

List No. 5.
Lathing.....10¢
Fencing, Painted Sheets.....20¢
Netting, Painted Sheets.....20¢
Door Mats, Galvanized.....25¢
Window Guards, Paneled.....15¢
Tree Guards, Paneled.....15¢

Extractors, Lemon Juice—See Squeezers, Lemon.**Fasteners, Blind—**

Mackrell's, 7 dos \$1.00.....20¢20¢10¢
Van Sand's Screw Pat. \$15 7 gr. 60¢10¢
Van Sand's Old Pat. \$15.00 7 gr. 65¢10¢
Austin & Eddy No. 2008 7 gr.....\$2.00
Security Gravity, 7 gr.....\$2.00
Zimmerman's.....45¢

Faucets.—

Fenn's.....40¢
Bohren's Pat. Rubber Ball.....25¢
Fenn's Cork Stops.....35¢5¢
Star.....40¢5¢
Frary's Pat. Petroleum.....40¢5¢
B. & L. B. Co.
West's Lock, Open and Shut Key.....50¢
Star, Metal Plug, new list.....40¢
Lockport, Metal Plug, reduced list.....60¢
Metallic Key, Leather Lined.....60¢10¢

Cork Lined.....70¢5¢70¢10¢

Burnside's Red Cedar.....50¢
Burnside's Red Cedar, bbl lots.....50¢10¢
John Sommers'
Peerless Best Block Tin Key.....40¢
IXL, 1st quality, Cork Lined.....40¢
Diamond Lock.....40¢
Perfection, Flat Red Cedar.....40¢
Goodenough Cedar.....50¢
Boss Metallic Key.....50¢
Reliable Cork Lined.....60¢
Western Pattern Cork Lined.....50¢

Seal Measuring.....\$3.00 @ \$3.50

Enterprise, 7 dos \$35.00.....30¢10¢
Lane's, 7 dos \$36.00.....25¢10¢
Victor, 7 dos \$36.00.....25¢10¢

Felloe Plates—See Plates, Felloe.**Fifth Wheels.—**

Derby and Cincinnati.....45¢5¢
Brewster.....50¢5¢

Files—

Domestic—
Nicholson Files, Rasps, &c.....60¢10¢60¢10¢5¢
Nicholson (X. F.) Files.....25¢
Nicholson's Royal Files (seconds).....75¢
(extra prices on certain sizes)
G. & H. Barnett (Black Diamond).....60¢10¢60¢10¢5¢
Eagle.....60¢10¢5¢60¢10¢5¢
Other makers, best brands 60¢10¢60¢10¢5¢
Fair brands.....60¢10¢10¢70¢5¢
Second quality.....70¢10¢70¢10¢
Heller's Horse Rasps.....50¢7¢50¢10¢
McCaffrey's Horse Rasps.....50¢10¢
Chease Horse Rasps, Hand Cut.....50¢10¢
Imported—
Butcher.....Butcher's list, 20¢
Stubs.....Stubs list, 25¢30¢

Fixtures.

Grindstone—
Sargent's Patent.....70¢10¢
Reading Hardware Co.....30¢10¢
P. S. & W. Co.....60¢10¢

Fluting Machines—See Machines, Fluting.**Fluting Scissors—See Scissors, Fluting.****Fodder Squeezers—See Squeezers, Fodder.****Forks—**

Hay, Manure, &c. Also list. 65¢5¢65¢10¢
Hay, Manure, &c. Phila. list. 60¢60¢5¢
Plated, see Spoons.

Frames—

Saw—
White Vermont.....7 gr 90.00 @ 10.00
Red, Polished and Varnished.....5¢ dos
\$1.50, 20¢

Screen, Window and Door—

Porter's Pat. Window and Door Frame.....33¢10¢
Warner's Screen Corner Irons.....33¢10¢
Stearns' Frames and Corners.....35¢25¢10¢
Cortland.....40¢40¢5¢

Freezers, Ice Cream—

White Mountain.....60¢60¢5¢
Granite State.....65¢65¢5¢
Aretic.....70¢70¢5¢
American.....60¢
Buffalo Champion.....65¢65¢5¢
Shepard's Lightning.....65¢65¢5¢
Gem.....65¢
Blissard.....70¢
Double Action Crown.....70¢
Crown.....70¢
Star.....60¢
Peerless.....60¢10¢
Giant.....60¢
Zero.....60¢10¢10¢
Keystone, P. D. & Co., each \$1.50.....30¢

Fruit and Jelly Presses—See Presses, Fruit and Jelly.**Fry Pans—See Pans, Fry.****Funnels.**

Gersdorff's Perfection, Standard and
Globe; 7 1/2 in, 1 gr, 10 1/2; 2 to 5 gr,
20 1/2; 5 to 10 gr, 20 1/2.....30¢
Copper, 1 to 6 dos, 15 1/2; 6 to 12
dos, 20 1/2; over 12 dos.....25¢

Furnaces, Soldering.

Burgess No. 3 Gem, tin reservoir.....\$7.00
Burgess No. 6 Gem, copper reservoir, 2.00

Fuse—Dia. 13/44. \$1033 ft

Common Hemp Fuse, for dry ground, \$2.70
Common Cotton Fuse, for dry ground, 2.30
Single Taped Fuse, for wet ground.....3.35
Double Taped Fuse, for very wet gr.....4.25
Triple Taped Fuse, for very wet gr.....5.60
Small Gutta Percha Fuse, for water, 7.50
Large Gutta Percha Fuse, for water, 12.00

Gates, Molasses—

Stebbin's Pattern.....30¢30¢5¢
Stebbin's Genuine.....60¢10¢10¢
Stebbin's Tinned Ends.....40¢10¢
Chase's Hard Metal.....50¢10¢
Bush's.....30¢
Lincoln's Fastener.....70¢70¢10¢
Weed's.....20¢10¢
Boss, 7 dos:
No. 1, 7; No. 2, 3; No. 3, 9; No. 4,
\$10.....60¢10¢10¢

Gauges.

Marking, Mortise, &c.....60¢10¢
Starratt's Surface, Center and Scratch.....25¢10¢

Wire, Wheeler, Madden & Co.....10¢
Wire, Morse's.....25¢
Wire, Brown & Sharpe's.....10¢20¢
Wire, P. S. & W. Co.....10¢10¢

Glimets—

Nail and Spike.....50¢10¢5¢
"Eureka" Glimets.....40¢10¢
"Diamond" Glimets.....7 gr \$5.00
Double Cut, Shepardson's.....45¢45¢5¢
Double Cut, Ives.....60¢60¢5¢
Double Cut, Douglass.....40¢10¢
"Bea," 7 gr \$12.....25¢35¢5¢

Glue—

Le Page's Liquid.....25¢35¢5¢
Upton's Liquid.....25¢
Improved Process.....25¢35¢5¢

Glue Pots—See Pots, Glue.**Grease, Axle.**

Fraser's.....Keg 7 1/2 4¢, Pail 7 1/2 5¢
Fraser's, in boxes.....7 gr \$0.50
Dixon's Everlasting, in bxs.....5¢ dos 10
\$1.20; 2 b \$2.00
Dixon's Everlasting.....10-b pails, ea. 85¢
Lower grades, special brands.....7 gr \$5.50 @ \$7.00

Grindstones—

Small, at factory.....7 ton \$7.50 @ 9.00
Family, regular list.....60¢
Family, Cleveland Stone Co.....20¢

Grindstone Fixtures—See Fixtures, Grindstone.**Hack Saws—See Saws.****Hafts, Awl.**

Sewing, Brass Per. 7 gr, \$2.50.....45¢10¢
Pat. Sewing, Short \$1.00 7 dos.....40¢10¢
Pat. Sewing, Long.....7 dos \$1.50
Pat. Peg, Plain Top, 7 gr \$10.00.....45¢10¢
Pat. Peg, Leather Top, 7 gr \$12.00, 45¢10¢

Halters.

Covert's, Rope, Jute.....60¢10¢10¢5¢
Covert's, Rope, 7-16-in. Jute.....70¢5¢
Covert's, Rope, 1/4-in. Hemp.....50¢5¢
Covert's Adj. Rope Halters.....40¢5¢
Covert's Hemp Horse and Cattle Tie.....50¢5¢
Covert's Jute Horse Ties.....70¢5¢
Covert's Jute Cattle Ties.....70¢10¢5¢
Covert's Adj. Web Halters.....35¢5¢5¢

Hammers—

Handled Hammers—
Maydole's, list Dec. 1, '85.....35¢10¢35¢
Buffalo Hammer Co.....50¢50¢10¢
Hudson & Beckley.....50¢50¢10¢
Atha Tool Co.....50¢50¢10¢
Verreco.....40¢10¢5¢
C. Hammond & Son.....40¢10¢5¢
Fayette H. Plumb
Artisan's Choice, A. E. Nail.....40¢12¢5¢
Regular Y. & P., A. E. Nail.....50¢
Horsehoe Turning Hammers.....50¢
Other Hammers.....60¢10¢
Hartford, Nail Hammers.....40¢5¢
Hartford, Machinists, &c.....50¢5¢5¢
Magnetic Tack, Nos. 1, 2, 3, \$1.25, 1.50 &
1.75.....30¢10¢
Nelson Tool Works.....40¢10¢
Warner & Nobles.....30¢5¢
Peck, Stow & Wilcox.....40¢
Sargent's.....35¢10¢

Heavy Hammers and Sledge—

3 b and under.....\$4.00
3 b and over.....\$4.00, 70¢70¢10¢
Over 5 b.....\$5.00
Wilkinson's Smiths.....10¢4¢11¢7¢

Handcuffs and Leg Irons—See Police Goods.**Handles—**

Cross-Out Saw Handles—
Atkins' No. 1 Loop, 7 pair, 35¢; No. 3
13¢; No. 6, 16¢; No. 2 and No. 4
Reverable, 15¢.
Champion.....12¢

Iron, Wrought or Cast—

Door or Thumb.
Nos.....0 1 2 3 4
Per doz.....\$0.90 1.00 1.10 1.35 1.50
60¢10¢
Boggin's Latches.....7 dos 80¢5¢
Bronze Iron Drop Latches.....7 dos 70¢ net
Jap'd Store Door Handles—Nuts, \$1.35
Plate, \$1.10; no Plate, \$0.85 net
Barn Door, 7 dos \$1.40.....10¢10¢
Chest and Lifting.....70¢

Wood—

Saw and Plane.....40¢10¢40¢10¢5¢
Hammer, Hatchet, Axe, &c.....4¢ @ 40¢5¢
Brad Awl.....7 gr \$2.00
Sickory Firmer Chisel, ass'd.....7 gr \$4.50
Sickory Firmer Chisel, large.....7 gr \$5.00
Apple Firmer Chisel, ass'd.....7 gr \$5.00
Apple Firmer Chisel, large.....7 gr \$5.00
Socket Firmer Chisel, ass'd.....7 gr \$5.00
Socket Framing Chisel, ass'd.....7 gr \$5.00
J. B. Smith & Co.'s Pat File.....5¢
File, assorted.....7 gr \$7.75
Auger, assorted.....7 gr \$5.00
Auger, large.....7 gr \$7.00
Pat. Auger, Ives.....30¢10¢
Pat. Auger, Douglass.....7 set \$1.75
Pat. Auger, Swan's.....7 set \$1.00
No. Rake, Shovel, &c.....50¢

Hangers—

Barn Door, old patterns... 60¢10¢10¢70¢
 Barn Door, New England... 60¢10¢10¢70¢
 Samson Steel Anti-Friction... 55¢
 Orleans Steel... 55¢
 Hamilton Wrought Wood Track... 55¢
 U. S. Wood Track... 55¢
 Champion... 55¢
 Rider and Wooster, Edding Mfg. Co.'s
 List... 70¢
 Climax Anti-Friction... 55¢
 Climax Anti-Friction for Wood Track... 55¢
 Zenith for Wood Track... 55¢
 Beed's Steel Arm... 50¢
 Challenge, Barn Door... 50¢
 Sterling... 50¢
 Victor, No. 1, \$15.00; No. 2, \$16.50; No. 3, \$18.00... 50¢
 Chidtree... 50¢10¢
 Kidder's... 50¢10¢60¢
 Boss... 50¢10¢
 Best Anti-Friction... 50¢10¢
 Duplex (Wood Track)... 50¢10¢
 Terry's Pat., 7 dos pr. 4 in. \$10.00; 5 in. \$12.00... 50¢10¢
 Terry's Steel Anti-Friction Leader... 50¢10¢
 Terry's Steel Anti-Friction Ideal... 50¢10¢
 Orank's Patent, Steel Covered... 50¢
 Wood Track Iron Clad, 7 ft. 160... 50¢

Carrier Steel Anti-Friction... 50¢10¢
 Architect, 7 set \$6.00... 20¢
 Holpice... 20¢10¢
 Felix, 7 set \$4.50... 20¢
 Richards... 30¢30¢10¢
 Lane's Standard... 50¢50¢10¢
 Lane's New Standard... 50¢50¢25¢
 Lane's Parlor... 50¢
 Ball Bearing Door Hanger... 30¢10¢25¢10¢
 Warner's Pat... 20¢10¢20¢10¢10¢
 Stearns' Anti-Friction... 20¢10¢20¢10¢10¢
 Stearns' Challenge... 25¢10¢25¢10¢10¢
 Faultless... 40¢40¢25¢
 American, 7 set \$6.00... 30¢10¢
 Rider & Wooster, No. 1, 62¢; No. 2, 75¢... 40¢
 Paragon, Nos. 1, 2 and 3... 40¢10¢
 Cincinnati... 25¢10¢
 Paragon, Nos. 5, 5½, 7 and 8... 20¢10¢
 Crescent... 60¢60¢10¢
 Nickel Cast Iron... 50¢
 Nickel, Malleable Iron and Steel... 40¢
 Scranton Anti-Friction Single Strap... 40¢
 Wild West, 4 in. Wheel, \$16.00; 5 in. Wheel, \$21.00... 45¢
 Star... 40¢10¢40¢10¢25¢
 May... 50¢50¢10¢10¢
 Interstate... 40¢10¢
 Magic... 45¢
 Pendulum, Payson's... 45¢

Harness Snaps—See Snaps.**Hatchets—**

American Axe and Tool Co.
 Hunt's... 40¢10¢
 Hunt's... 50¢
 Mann's... 50¢
 Peck's... 50¢
 Underhill's... 50¢
 Buffalo Hammer Co... 50¢
 Fayette R. Plumb... 50¢
 C. Hammond & Son... 50¢
 Sargent & Co... 50¢
 P. S. & W. Co... 50¢
 Ten Eyck Edge Tool Co... 10¢
 Collins... 10¢
 Schulte, Lohoff & Co... 50¢50¢25¢

Hay and Straw Knives—See Knives.**Hinges—**

Blind Hinges—
 Parker... 75¢25¢
 Huber... 50¢
 Clark's, Nos. 1, 2, 3, 4 and 5... 50¢
 Clark's Morris Gravity... 75¢10¢50¢30¢
 Sargent's Nos. 1, 2, 3, 5, 11, 15... 75¢10¢50¢30¢
 Sargent's No. 12... 75¢10¢50¢30¢
 Reading's Gravity... 75¢10¢50¢30¢
 Shepard's... 75¢10¢50¢30¢
 Noiseless... 75¢10¢
 Niagara... 30¢
 Buffalo... 30¢
 Clark's Genuine Pattern... 30¢
 O. B. Lull & Porter... 75¢10¢
 Acme, Lull & Porter... 75¢
 Queen City Reversible... 75¢10¢50¢30¢
 Clark's Lull & Porter, Nos. 0, 1, 1½, 2, 2½, 3... 75¢10¢50¢30¢
 North's Automatic Blind Hinges, No. 2, for Wood, \$6.00; No. 3, for Brick, \$11.50... 10¢

Gate Hinges—
 Western... 75¢40¢, 60¢
 N. E... 75¢40¢, 55¢
 W. E. Reversible... 75¢40¢, 55¢
 Clark's, Nos. 1, 2, 3... 60¢10¢55¢
 V. Y. State... 75¢40¢, 55¢10¢
 automatic... 75¢40¢, 55¢10¢
 Shepard's... 60¢10¢55¢

Spring Hinges—
 Geer's Spring and Blank Butts... 40¢
 Union Spring Hinge Co.'s List, March 1888... 25¢
 Barker's Double Acting... 25¢
 Union Mfg. Co... 25¢
 Hammer's... 25¢
 Buckman's... 25¢
 Chicago... 25¢
 Bardley's Patent... 40¢
 Acme... 30¢
 C. S... 25¢10¢
 Empire and Crown... 20¢
 Hero and March... 55¢
 American, Gem, and Star... 20¢
 Oxford... 20¢
 Wiles... 10¢
 Devore's... 40¢
 Rex... 40¢
 Royal... 60¢
 Reliable... 60¢
 Champion... 60¢
 Stearns... 60¢
 Saniton, 7 gross... \$14.00

Wrought Iron Hinges.
 List February 14, 1891... 50¢10¢
 Strap and T... 50¢10¢

Corrugated Strap & T... 50¢10¢50¢10¢10¢
 Screw Hook and Strap... 14 to 20 in. 75¢, 30¢
 Strap... 22 to 36 in. 75¢, 30¢
 Screw Hook and Eye... ¼ in. 75¢, 30¢
 ½ in. 75¢, 30¢
 ¾ in. 75¢, 30¢
 Rolled Blind Hinges, Nos. 33 and 34... 50¢10¢
 Rolled Blind Hinges, Nos. 223 and 224... 50¢10¢
 Rolled Plate... 70¢10¢
 Rolled Raised... 70¢10¢
 Plate Hinges 8, 10 & 12 in. 75¢, 30¢
 "Providence" over 12 in. 75¢, 30¢

Hoes—
 Eye—
 D. & H. Scovill... 20¢
 Lane's Crescent Planters Pattern... 45¢25¢
 Lane's Razor Blade, Scovill Pattern... 30¢
 Maynard, S. & O. Pat... 45¢25¢
 Sandusky Tool Co., S. & O. Pat... 50¢10¢5¢
 Pat... 60¢
 Chattanooga Tool Co., S. & O. Pat... 60¢
 Grub... 50¢10¢10¢
 Handled—
 Garden, Mortar, &c... 70¢
 Planter's, Cotton &c... 70¢
 Warren Hoe... 70¢
 Magic... 75¢40¢

Hop Rings and Rings—See Rings and Ringers.
Hoisting Apparatus—See Machines, Hoisting.
Hollow-Ware—See Ware, Hollow.

Holders.
 Sprengle's Pat... 75¢40¢18¢... 60¢
 Bit.
 Extension.
 Barber's, 7 dos \$15.00... 40¢40¢10¢
 Ives, 7 dos \$20.00... 60¢50¢10¢10¢
 Diagonal... 7 dos \$24.00, 40¢
 Angular... 7 dos \$24.00, 40¢55¢
File and Tool—
 Bala Pat... 75¢40¢, 25¢
 Nicholson File Holders... 30¢
 Dick's Tool Holder... 30¢

Hooks—
 Cast Iron—
 Bird Cage, Sargent's Hat... 60¢10¢10¢
 Bird Cage, Reading... 60¢10¢10¢
 Clothes Line, Sargent's Hat... 60¢10¢10¢
 Clothes Line, Reading List... 60¢10¢60¢10¢10¢
 Ceiling Sargent's Hat... 55¢10¢10¢
 Harness, Reading List... 55¢10¢60¢10¢10¢
 Coat and Hat, Sargent's Hat... 55¢10¢60¢10¢
 Coat and Hat, Reading... 50¢10¢50¢10¢10¢
Wrought Iron—
 Cotton... 75¢40¢, 15¢
 Cotton Pat. (N.Y. Mallet & Handle Wks)... 30¢
 Tassel and Picture (T. & S. Mfg. Co.)... 50¢
 Wrought Staples, Hooks, &c... 50¢
Wire—
 Wire Coat and Hat, Gem, List April, 1888... 60¢50¢10¢
 Wire Coat and Hat, Miles, List April, 1888... 50¢50¢10¢
 Indestructible Coat and Hat... 45¢15¢55¢
 Wire Coat and Hat, Standard... 60¢60¢10¢
 Handy Hat and Coat... 50¢10¢60¢
 Steady Ceiling Hooks... 50¢10¢60¢
 Belt... 80¢40¢10¢
 Atlas Coat and Hat... 60¢60¢10¢
 Bright Wire Goods, see Wire.

Miscellaneous.
 Grass, No. 2, \$2.00; No. 3, \$2.25; No. 4, \$2.50
 No. 5, \$2.75; No. 6, \$3.00
 Bush... 55¢
 Whitmore's Patent... 55¢
 Hooks and Eyes—Malleable Iron... 70¢70¢10¢
 Hooks and Eyes—Brass... 60¢10¢10¢
 Fish Hooks, American... 50¢
 Bench Hooks... See Bench Stops.
Horse Nails—See Nails, Horse.
Horse Shoes—See Shoes, Horse.
Hose, Rubber—
 Competition... 75¢75¢25¢
 Standard... 60¢10¢50¢10¢10¢
 Extra... 60¢10¢60¢
 N. Y. B. & P. Co., Para... 25¢25¢
 N. Y. B. & P. Co., Extra... 40¢40¢55¢
 N. Y. B. & P. Co., Dundee... 40¢10¢60¢

Huskers—
 Blair's Adjustable... 75¢ gr \$8.00
 Blair's Adjustable-Clipper... 75¢ gr 7.00
 Hubbard's Solid Steel... 75¢ gr 4.50
Indurated Fiber-Ware—See Ware, Indurated Fiber.
Irons.
 Sad—
 From 4 to 10, at factory... 100¢
 Self-Heating... 75¢40¢, 25¢
 Self-Heating, Tailors... 75¢40¢, 25¢
 Mrs. Pott's Irons... 60¢60¢10¢
 Enterprise Star Irons... 60¢60¢10¢
 K X Cold Handle Sad Iron... 60¢60¢
 Ideal Irons new List... 50¢10¢50¢
 Salamander, Irons... 25¢
 B. B. Sad Irons... 30¢
 Combined Fluter and Sad Iron... 15¢
 Fox Reversible, Self-Fluter... 75¢40¢
 Chinese Laundry (N.E. Butt Co) \$4.50, 15¢
 New England... 15¢
 Mahony's Troy Pat. Irons... 25¢
 Sensible, List Jan. 91... 50¢10¢55¢
 Sensible Tailor's Irons... 35¢
 National Self-Heating... 30¢

Soldering—
 Soldering Coppers... 75¢19¢, 21¢
 Cover's Adjustable, List Jan. 1 1886... 35¢25¢
Irons, Pinking, per dos, 65¢.
Jack Screws—See Screws.
Jacks, Wagon.
 Daisy... 40¢
 Victor... 40¢
 Lockport... 40¢

Kettles—

Brass, Spun, Plain, List Jan. 1, '91... 75¢55¢
 Brass, Spun, Flat, W. List Jan. 1, '91... 75¢
 Enamelled and Tea—See Hollow Ware.

Keys—

Lock Ass'n's List Dec. 30, 1888... 50¢10¢
 Eagle, Cabinet, &c... 60¢25¢
 Hotchkiss' Brass Blanks... 40¢
 Hotchkiss' Copper and Tinned... 40¢
 Hotchkiss' Pat. and Cab... 35¢
 Ratchet Key... 75¢40¢, 15¢
 Wollensack Tinned... 50¢10¢

Knife Sharpeners—See Sharpeners, Knife.

Knives.

Wilson's Butcher Knives, List Dec. 8, 1890... 25¢
 Ames' Butcher Knives... 25¢
 Foster Bros' Butcher, &c... 40¢
 Jordan's A. Butcher's, List... 40¢
 Nichols' Butcher Knives... 40¢10¢
 W. W. Wilson, Butcher, 6 in. \$2.00; 7 in. \$2.70; 8 in. \$3.50, &c... 30¢25¢
 Ames' Bread Knives, 7 dos \$1.50, 15¢20¢
 Moran's Shoe and Bread... 20¢
 Hay and Straw... See Hay Knives.
 Table and Pocket... See Cutlery.
 Corn, Auburn Mfg. Co. Western Pat... \$2.00
 Corn, Auburn Mfg. Co. Crescent... \$3.50

Drawings—
 Bradley's... 10¢
 Wadsworth... 25¢
 Witherby... 75¢75¢10¢
 P. S. & W... 75¢75¢10¢
 Mix... 75¢75¢10¢
 New Haven... 60¢10¢60¢10¢55¢
 Merrill... 75¢75¢55¢
 Douglas... 15¢10¢25¢
 Watrous... 20¢25¢
 L. & J. White... 35¢
 Bradley's... 35¢
 Adjustable Handle... 25¢33¢45¢
 Wilkinson's Folding... 25¢25¢45¢

Hay and Straw—
 Lightning from Jobbers... 25¢40¢, 50¢
 Wadsworth's... 75¢40¢10¢
 Carter's Needle... 75¢40¢11¢50¢
 Heath's... 75¢40¢13¢50¢
 Auburn Hay, Com. and Spear Point... 40¢
 Nollin's Hay... 75¢40¢\$3.00
 Am. (34 quality), 7 gr., 1 blade, 7¢; 2 blades, 12¢; 3 blades, 18¢... net
 Lithrop's... 20¢10¢
 Smith's, 7 dos, Single, \$2.00; Double, \$3.00... 40¢45¢
 Knapp & Cowles... 50¢10¢50¢
 Buffalo Adjustable... 75¢40¢, 55¢
 Buffalo Double Adj table... 75¢40¢, 55¢

Knobs—
 Door Mineral... 60¢65¢
 Door Por. Jap'd... 70¢75¢
 Door Por. Nickel... 75¢40¢35¢
 Door Por. Plated, Nickel... 75¢40¢35¢
 Picture, Judd's... 70¢10¢10¢
 Hemacite Door Knobs... 40¢10¢50¢
 Yale & Towne Wood, List Dec. 1888... 40¢
 Furniture, Plain... 75¢ gr 10¢, 10¢
 Furniture, Wood Screws... 25¢10¢
 Base, Rubber Tip... 70¢10¢55¢
 Picture, Sargent's... 60¢10¢10¢70¢
 Picture, Hemacite... 55¢55¢
 Shutter, Porcelain... 55¢10¢
 Carriage, Jap... 75¢ gr 80¢, 60¢10¢
 Barsley's Wood Door, Shutter, &c... 40¢

Ladies—
 Melting, Sargent's... 55¢10¢
 Melting, Reading... 55¢10¢
 Melting, Monroe's Pat... 75¢40¢, 40¢
 Melting, P. S. & W... 55¢10¢40¢
 Melting, Warner's... 30¢

Lanterns—
 Tubular—
 Plain with Guards, 7 dos... \$3.75¢4.00
 Lift Wire, with Guards... \$4.00¢4.25
 Square Plain, with Guards... \$3.75¢4.00
 Sq. Lift Wire, with Guards... \$4.50
Police Lanterns (including packages).
 2½-inch Bull's-eye Police regular... 75¢
 3-inch Bull's-eye Police regular... 75¢
 3½-inch Bull's-eye Police flash light... 75¢
 3-inch Bull's-eye Police flash light... 75¢
 3-inch Bull's-eye Police flash light... 75¢

Lawn Mowers—See Mowers, Lawn.
Leaders, Cattle.
 Humason, Beckley & Co.'s... 70¢
 Sargent's... 60¢60¢10¢
 Hotchkiss... 30¢
 Peck, Stow & W. Co... 60¢10¢

Lemon Squeezers—See Squeezers, Lemon.
Lifters, Transom.
 Wollensack's... 50¢
 Class 3 and 4, Bronzed Iron... 50¢
 Class 3 and 4, Bronzed Metal... 25¢
 Class 3 and 4, Brass... 35¢
 Skylight Lifters... 35¢
 Crown, Eagle and Shield... 60¢
 Reith's, List Feb. 20, 1891... 60¢
 Bronzed Iron Rods... 50¢10¢10¢25¢
 Brass, Real Bronze or Nickel Plated... 30¢
 Excelsior... 50¢10¢
 Payson's... 50¢10¢

Universal.
 Solid Grip... 60¢10¢
 Imperial... 50¢10¢

Lines—
 Cotton and Linen Fish, Draper's... 50¢
 Draper's and Tate's Chalk... 60¢
 Draper's Mason's' Lines, 5½ ft. No. 1, 1.25; No. 2, 1.75; No. 3, 2.25; No. 4, 2.75; No. 5, 3.25... 25¢
 Cotton Chalk... 55¢
 Samson Cotton, No. 4, 2½; No. 4½, 3.50; No. 5, 4.50... 10¢
 Silver Lake, Braided, No. 0, \$6.00; No. 1, \$6.50; No. 2, \$7.00; No. 3, \$7.50... 25¢
 Mason's Lines, No. 3½, \$1.50; No. 4, \$2.00; No. 4½, \$2.50... 25¢

Mason's Colored Cotton... 45¢
 Wire Clothes... Nos. 1, 2, 3, 4... 30¢
 100 ft... \$3.50 \$8.00 \$2.50
 Ventilator Cord, Samson Braided, White or Drab Cotton... 75¢40¢, 50¢

Links, Open.

Terry's—per gro.:
 Nos. 1, 2, 3, 4... 100 8.00 12.00 16.00

Locks, &c.—

Cabinet—
 Eagle, Gaylord Par... List March, '84, rev. ker and Corbin... Jan. 1, '85... 45¢
 Delta, Nos. 36 to 39... 40¢
 Delta, Nos. 41 to 43... 40¢10¢
 Delta, Nos. 45 to 48... 30¢
 Stoddard Lock Co... 30¢25¢45¢
 "Champion" Night Latches... 40¢40¢10¢
 Barnes Mfg. Co... 40¢40¢10¢
 Eagle and Corbin Trunk... 25¢25¢
 "Champion" Cab. and Combin... 35¢45¢
 Yale... net prices
 Romer's... 35¢
Door Locks, Latches, &c.
 R. & E. Mfg. Co., List Mar. 30, 1891... 65¢10¢70¢
 Mallory, Wheeler & Co., List July, '88... lower net
 Sargent & Co., List Aug. 1, '88... prices often made.
 Reading Hardware Co., List Feb. 1, '88...
 Brittan, Graham & Mathes, List Jan. 1890... 60¢10¢10¢
 Perkins' Burglar Proof... 60¢25¢
 Plate... 35¢12¢
 Barnes Mfg. Co... 40¢40¢10¢
 Yale... net prices
 Delta Flat Key... 30¢
 L. & C. Round Key Latches... 30¢10¢
 L. & C. Flat Key Latches... 35¢10¢
 Romer's Night Latches... 15¢
 Brooklyn Latches... 50¢10¢
 Shephardson or U. S... 35¢
 Seed's N. Y. Hap Lock... 25¢

Padlocks—
 List June 10, 1891... 50¢25¢
 Norwich Lock Mfg. Co., old list... 70¢25¢
 Yale Lock Mfg. Co.'s... net prices
 Eagle... 35¢25¢
 Eureka, Eagle Lock Co... 40¢25¢
 Romer's, Nos. 0 to 91... 30¢
 Romer's Scandinavian, &c., Nos. 100 to 506... 15¢
 A. E. Deits... 40¢
 Champon Padlocks... 40¢
 Hotchkiss... 30¢
 Star... 45¢
 Horseshoe... 75¢40¢, 40¢40¢10¢
 Barnes Mfg. Co... 40¢40¢10¢
 No. 1... 30¢
 Brown's... 25¢
 Scandinavian... 50¢40¢10¢
 E. T. Fraim's Keystone Scandinavian... 50¢
 Nos. 119, 120, 130 and 140... 30¢10¢
 Other Nos... 60¢
 Ames Sword Co. up to No. 150... 40¢
 Ames Sword Co. above No. 150... 50¢
 Slaymaker Barry & Co... 35¢25¢
 No. 1010 line... 45¢10¢
 No. 41 line... 45¢10¢
 No. 61 line... 50¢25¢
 No. 21 line... 75¢
 Sash, &c...
 Clark's, No. 1, \$10; No. 2, \$5 gr... 35¢45¢
 Ferguson's... 50¢10¢
 Victor... 60¢10¢10¢
 Walker's... 10¢
 Attwell Mfg. Co... 55¢25¢45¢
 Reading... 60¢10¢60¢10¢10¢
 Hammond's Window Springs... 40¢
 Common Sense, Jap'd, Cop'd and Br'd... \$2.40
 Common Sense, Nickel Plated... \$ gr \$10.00

Universal.
 Kempshall's Gravity... 30¢
 Kempshall's Model... 60¢60¢10¢
 Corbin's Daisy, List Feb. 16, 1891... 70¢
 Payson's Perfect... 35¢25¢
 Huginlin's Sash Balances... 25¢25¢
 Huginlin's New Sash Locks... 25¢25¢
 Stoddard "Practical"... 10¢
 Ives' Patent... 60¢10¢60¢10¢45¢
 Lescher's, No. 100, 7 gr \$5; 105, \$10; 150, \$15... 30¢
 Davis, Bronze, Barnes Mfg. Co... 30¢
 Champion Safety, List January, 1886... 75¢
 Security... 70¢

Lumber Tools—See Tools, Lumber.
Lustre—
 Four-ounce Bottles... 75¢ dos, \$1.75; 7 gross... \$17.0

Machines.
Boring—
 Without Augers. Upright. Angular... 50¢
 Douglas... \$5.50 \$6.75... 50¢
 Snel's, Hice's Pat. 5.50 6.75 40¢10¢10¢
 Jennings... 5.50 6.75 45¢45¢10¢
 Other Machines... 5.50 2.75...
 Phillips' Patent... 7.00 7.50...
 with Augers... 7.50...
 Miller's Falls... 7.50...
Fluting.
 Knox, 4½-inch Rolls... \$3.25 each }
 Knox, 6-inch Rolls... \$3.60 each }
 Eagle, 3½-inch Roll... \$2.15... 35¢
 Eagle, 5½-inch Roll... \$2.55... 35¢
 Crown, 4½ in. \$3.50; 6 in. \$4.00; 8 in. \$6.50 each... 35¢
 Crown Jewel 6 in... \$3.50 each, 35¢
 American, 5 in. \$3.00; 6 in. \$3.40; 7 in. \$4.50 each... 35¢
 Domestic Fluter... each, \$1.50
 Geneva Hand Fluter, White Metal... \$ dos \$12, 25¢
 Crown Hand Fluter, No. 1, \$15.00; \$12.50, \$10.00... 30¢
 Shepard Hand Fluter, No. 35 7 dos 15 30... 40¢
 Shepard Hand Fluter, No. 110 7 dos 11 30... 40¢
 Shepard Hand Fluter, No. 56 7 dos 11 30... 40¢
 Clark's Hand Fluter, 7 dos \$15.00... 35¢
 Combined Fluter and Sad Iron... 75¢
 Buffalo... 75¢ dos \$15.00... 30¢
 Buffalo... 75¢ dos \$10.00... 10¢

Rotating—
 Moore's Hand Holst, with Lock Brake... 30¢
 Moore's Differential Pulley Block... 40¢
 Working Mfg. Co's... 35¢
 Sure Grip Steel Tackle Blocks... 25¢
 Anthony Wayne, 7 dos No. 1, \$51 No. 2, \$45; No. 3, \$42...
 Western Star 7 dos No. 2, \$45 No. 3 \$48.

Mallets.
Hickory.....20¢10¢30¢10¢10¢
Lignumvite.....20¢10¢30¢10¢10¢
B. & L. Block Co., Hickory & L. V.
80¢30¢10¢

Mattocks, Regular list.
60¢10¢60¢10¢25¢

Measures—
Standard Fiberware, No. 1, peck, 7
dosen, \$4; 1/2 peck, \$3.50.
Meat Cutters—See Cutters, Meat.

Menders, Harness—
Per doz.....\$2.00

Mills.
Coffee—
Box and Side, List Jan. 1, 1888, 60¢10¢—
American, Enterprise Mfg Co. 30¢10¢30¢
The Swift, Lane Bros.....30¢10¢

Mining Knives—See Knives,
Mining.

Molasses Gates—See Gates, Mo-
lasses.

Money Drawers—See Drawers,
Money.

Mowers, Lawn.
Pennsylvania, New Model, Excelsior,
Continental, &c.....60¢60¢5¢
Philadelphia.....60¢10¢
Perfection.....60¢10¢10¢
Easy.....60¢10¢60¢10¢10¢
Bay State.....60¢10¢60¢10¢10¢
Other Machines.....60¢10¢60¢70¢

Muzzles—
Safety.....7¢ dos, \$3.00, 25¢

Nails.
Cut and Wire. See Trade Report.
Wire Nails, Papered.
Association List, July 15, '89, 75¢10¢30¢
Tack Mfrs. list.....70¢70¢10¢
Wire Nails, Standard Penny.
Card June 1 '89 base.....\$1.95 @ \$2.00

Horse.
Nos. 6 7 8 9 10
Ausable.....28¢ 20¢ 25¢ 24¢ 23¢.
Clinton, Fin.....19¢ 17¢ 16¢ 15¢ 14¢.....30¢
Essex.....28¢ 20¢ 25¢ 24¢ 23¢.
40¢25¢5¢2¢
Lyra.....19¢ 17¢ 16¢ 15¢ 14¢.....80¢
Snowden.....19¢ 17¢ 16¢ 15¢ 14¢.....80¢
Fulham.....33¢21¢ 30¢ 19¢ 18¢.
1000 lb in year 10¢
Vulcan.....23¢ 21¢ 20¢ 19¢ 18¢.....13¢2¢10¢
Northwest.....23¢ 21¢ 20¢ 19¢ 18¢.
25¢25¢25¢
Globe.....23¢ 21¢ 20¢ 19¢ 18¢.
20¢25¢25¢
Boston.....23¢ 21¢ 20¢ 19¢ 18¢.
20¢25¢25¢
A. C.....25¢ 23¢ 22¢ 21¢ 21¢.
25¢10¢33¢42¢
C. B. K.....25¢ 23¢ 22¢ 21¢ 21¢.
25¢10¢33¢42¢
Maud S.....25¢ 23¢ 22¢ 21¢ 21¢.
40¢10¢
Champlain.....28¢ 26¢ 25¢ 24¢ 23¢.
25¢10¢10¢
Sarane.....23¢ 21¢ 20¢ 19¢ 18¢.....30¢10¢
Champion.....23¢ 21¢ 20¢ 19¢ 18¢.
30¢25¢30¢10¢
Capewell.....28¢ 26¢ 25¢ 24¢ 23¢.
30¢25¢30¢10¢
Star.....23¢ 21¢ 20¢ 19¢ 18¢.
10¢10¢10¢12¢
Anchor.....23¢ 21¢ 20¢ 19¢ 18¢.....30¢
Western.....23¢ 21¢ 20¢ 19¢ 18¢.....40¢10¢
Empire Bros.....14¢ 10¢

Picture—
Brass Head, Sargent's list.....60¢10¢10¢
Brass Head, Combination list.....50¢10¢
Porcelain Head, Sargent's list.....60¢10¢10¢
Porcelain Head, Combination list.....40¢10¢
Niles' Patent.....40¢

Nail Pullers—See Pullers, Nail.

Nail Sets—See Sets, Nail.

Nut Crackers—See Crackers, Nut.

Nuts—List Dec. 18, 1889.
Hot Pressed.....5.3¢ 5.0¢ off list.
Cold Punched.....5.00¢ 5.10¢ off list.
In packages of 100 lb, add 1-10¢ lb.
net; in packages less than 100 lb, add
1/2¢ lb. net.

Onkum—
Best or Government.....7¢ 7¢1/2¢
U. S. Navy.....6¢ 6¢1/2¢
Navy.....5¢ 5¢1/2¢

Oilers—
Zinc and Tin.....65¢10¢70¢
Brass and Copper.....60¢10¢50¢10¢5¢
Malleable, Hammer Improved, No. 1,
\$3.00; No. 2, \$4.00; No. 3, \$4.40 7¢ dos.
10¢10¢10¢
Malleable, Hammers, Old Pattern, same
list.....40¢
Prior's Pat. or "Paragon" Zinc.....40¢
Prior's Pat. or "Paragon" Brass.....60¢
Olmstead's Tin and Zinc.....60¢
Olmstead's Brass and Copper.....60¢
Broughton's Zinc.....50¢
Broughton's Brass.....60¢
Gem P. D. & Co.....7¢ gro. \$2
Steel, Draper and Williams.....50¢

Openers, Can.
Messenger's Comet.....7¢ dos \$3.00, 25¢
American.....7¢ gross \$2.75 @ \$3.00
Duplex.....25¢ 25¢, 10¢20¢
Lyman's.....7¢ dos \$3.75, 20¢
No. 4 French.....7¢ dos \$2.25, 55¢60¢
No. 5, Iron Handle.....7¢ gr \$6.00, 45¢50¢
Eureka.....7¢ dos \$2.50, 10¢
Sardine Sissors.....7¢ dos \$2.75 @ \$3.00
Star.....\$1.20, \$1.25, \$1.30, \$1.35
Sprengle, No. 1 \$2.00; No. 2, \$1.50 @ \$1.60
Execlator No. 1 \$2.50; No. 2, \$1.50 @ \$1.60
World's Best, 7¢ gross, No. 1, \$12.00
No. 2, \$24.00; No. 3, \$36.00.....50¢10¢
Universal, 7¢ dos \$3.00.....54¢65¢
Domestic, 7¢ dos \$2.50.....54¢
Champion 7¢ dos \$2.00.....54¢

Packing, Steam—
Standard.....60¢50¢5¢
Extra.....60¢50¢5¢
N. Y. B. & P. Co., Standard.....60¢
N. Y. B. & P. Co., Empire.....60¢
N. Y. B. & P. Co., Salamander.....25¢
Jenkins' Standard, 7¢ 80¢, 25¢25¢25¢

Miscellaneous—
American Packing.....10¢11¢ 7¢
Russia Packing.....14¢ 7¢
Italian Packing.....13¢14¢ 7¢
Cotton Packing.....15¢17¢ 7¢
Jute.....7¢2¢6¢

Padlocks—See Locks.

Pails.

Galvanized Iron—
Quarts 10 12 14
Hill's Light Weight, 7¢ dos. \$2.75 3.00 3.25
Hill's Heavy Weight, 7¢ dos. 3.00 3.25 3.75
Helwig's.....2.50 2.75 3.00
Sidney Shepard & Co.....2.35 2.85 3.00
Iron Glad.....2.50 2.75 3.00
Fire Buckets.....2.75 3.35 3.50
Buckets, see Well Buckets.

Indurated Fibre Ware—25¢
Star Pails, 12 qt.....7¢ dos \$5.40
Stable and Milk, 14 qt.....7¢ dos \$6.00
Fire Pails, deep.....7¢ dos \$5.40
" round bottom.....7¢ dos \$7.80

Standard Fibre Ware—Plain. Dec'd
Water Pails, 12 qt., per doz.....\$4.00 \$4.50
Dairy Pails, 14 qt., per doz.....4.50 5.00
Fire Pails, No. 1, 12 qt. per doz.....4.50
Fire Pails, No. 3, 14 qt. per doz.....5.00
Sugar Pails.....6.00 6.50
Horse Pails.....5.00
Buggy Pails.....4.00
Slop Jars (bal. trap).....8.00 9.00
Chamber Pails, 14 qt.....6.50 7.50

Pans.

Dripping.
Small list.....7¢ 5¢4¢
Large sizes.....7¢ 5¢4¢
Silver & Co. (Covered).....40¢

Fry—
Standard List:
No.....0 1 2 3 4
7¢ dos. \$3.00 \$3.75 \$4.25 \$4.75 \$5.25
No.....5 6 7 8 9
7¢ dos. \$6.00 \$7.00 \$8.00 \$9.00
Poised, regular goods.....75¢75¢10¢
Aeme Fry Pans.....60¢10¢

Dust—
Steel Edge, No. 1.....7¢ dos \$1.75

Paper and Cloth—

Sand and Emery—
List April 19, 1886.....50¢50¢10¢
Sibley's Emery and Crocus Cloth.....30¢

Parers.

Apple.
Advance.....7¢ dos \$4.75
Baldwin.....7¢ dos 5.25
Bonanza.....each 5.00
Daisy.....7¢ dos 4.00
Dandy.....each 7.50
Eclipse.....7¢ dos 4.55
Eureka, 1888.....each 16.00
Family Bay State.....7¢ dos 13.00
Favorite.....7¢ dos 5.00
Gold Medal.....7¢ dos 4.00
Ideal.....7¢ dos 4.00
Improved Bay State.....7¢ dos \$7.00 @ \$9.00
Little Star.....7¢ dos 4.50
Marching.....7¢ dos 13.50
New Light.....7¢ dos 5.50
Orion.....7¢ dos 4.00
Penn.....7¢ dos 4.00
Perfection.....7¢ dos 4.00
Pomona.....7¢ dos 4.00
Rocking Table.....7¢ dos 4.00
Turn Table.....7¢ dos 4.00
Victor.....7¢ dos 13.50
Waverly.....7¢ dos 4.00
White Mountain.....7¢ dos 4.00
73.....7¢ dos 4.25
72.....7¢ dos 7.00

Casto—
White Mountain.....7¢ dos \$4.50
Antrim Combination.....7¢ dos \$5.50
Rooster.....7¢ dos \$13.50
Saratoga.....7¢ dos \$5.50

Pencils—

Faber's Carpenters'.....high list 50¢
Faber's Round Gilt.....7¢ gro \$5.25
Dixon's Lead.....7¢ gro \$4.50
Dixon's Lumber.....7¢ gro \$6.75
Dixon's Carpenters'.....10¢

Pickers—

Railroad or Adse Eye, 5 to 6, \$12.00;
6 to 7, \$13.00.....60¢10¢60¢10¢5¢

Picture Nails—See Nails, Picture.

Pinking Irons—See Irons, Pinking.

Pins.

Low—
Hudson, Beckley & Co.'s.....60¢10¢
Sargent Co.'s, \$17 and \$1.....60¢10¢
Peck, Stow & W Co.....60¢10¢50¢10¢25¢

Curtain—
Silvered Glass.....net
White Enamel.....net
Escutcheon.....net

Iron, list Nov. 1, 1885. 50¢10¢50¢10¢5¢
Brass.....60¢60¢5¢

Pipe, Wrought Iron—

List September 18, 1889.
14 and under, Plain.....67¢1/2¢
14 and under, Galvanized.....47¢1/2¢
14 and over, Plain.....67¢1/2¢
14 and over, Galvanized.....55¢
Boiler Tubes.
Sizes up to 2 1/2 in. inclusive.....55¢
Sizes 3 in. and larger.....55¢
Casing.....55¢
Inserted Joints Casing.....50¢
Steel Boiler Tubes.....50¢

Planes and Plane Irons—

Wood Planes—
Molding.....40¢10¢
Bench, First Quality.....50¢10¢
Bench, Second Quality.....50¢10¢
Bailley's (Stanley R. & L. Co.).....40¢10¢

Iron Planes—
Bailley's (Stanley R. & L. Co.).....40¢10¢
Miscellaneous Planes (Stanley R. & L. Co.).....50¢10¢
Victor Planes (Stanley R. & L. Co.).....50¢10¢
Steer's Iron Planes.....35¢35¢10¢
Meriden Mal. Iron Co.'s.....40¢40¢10¢
Davis's Iron Planes.....40¢40¢10¢
Birmingham Plane Co.....50¢50¢10¢
Gage Tool Co.'s Self-Setting.....40¢40¢10¢
Chapman's Iron Planes.....50¢50¢10¢
Sargent's.....50¢50¢10¢
Standard Tool Co.....50¢50¢5¢

Plane Irons—
Butcher's.....\$5.00 @ \$5.25 to 5¢
Buck Bros.....50¢
Auburn "Thistle".....30¢10¢
Sandusky.....30¢10¢
S. & J. White.....25¢

Plates.
Felloe.....7¢ 6¢4¢10¢

Pliers and Nippers—

Button's Patent.....50¢50¢10¢
Hall's No. 2, 5 in., \$13.50; No. 4, 7 in.
\$21.00 7¢ dos.....20¢10¢33¢
Hudson & Beckley Mfg. Co. 50¢50¢10¢
Lindsay's Giant.....40¢
Gas Pliers.....60¢5¢
Eureka Pliers and Nippers.....40¢
Russell's Parallel.....25¢
P. S. & W. Cast Steel.....50¢
P. S. & W. Timmers' Cutting Nippers,
add 8¢ dis 10¢

Carew's Pat. Wire Cutters.....20¢
Morrell's Parallel, 7¢ dos, \$12.00.....30¢5¢
Cronk's 5 in., \$15.00; 10 in. \$21.00.
40¢40¢5¢

Plumbs and Levels—

Regular List.....70¢10¢70¢10¢10¢
Davison's.....50¢
Pocket Levels.....70¢10¢70¢10¢10¢
Davis' Inclinoimeters.....10¢10¢

Ponchers.

Egg.
Buffalo Steam Egg Ponchers, 7¢ dos, No.
1, \$5.00; No. 2, \$9.00.....35¢
Silver & Co. 6-Ingw. 7¢ dos \$4; 3-Ring \$3
Picks, Animal.....30¢

Bishop's I. X. L.....7¢ dos \$5.00
Bishop's O. K.....7¢ dos \$5.25
Bishop's Pioneer.....7¢ dos \$3.75
Bishop's American.....7¢ dos \$3.75
Eagle, Double Stale.....7¢ dos \$5.75
Eagle, Single Stale.....7¢ dos \$3.75
Buckeye, Single Stale.....7¢ dos \$2.75

Police Goods.

R. I. Tool Co., Handcuffs, \$15.00 7¢ dos 10¢
R. I. Tool Co., Leg Irons, \$25.00 7¢ dos 10¢
Towers.....25¢
Daley's Improved Handcuffs: 2 Hands,
Polished, 7¢ dos \$45.00; Nicklel,
\$27.00; 3 Hands, Polished, 7¢
\$72.00; Nicklel, \$54.00.....25¢
J. P. Lovell's Police Goods.....25¢

Polish, Metal.

Prestoline.....30¢
Prestoline Paste.....35¢4¢
Gardner's Silver Compound.....35¢4¢

Polish, Stone.
Joseph Dixon's.....7¢ gro \$6.00, 10¢
Gem.....7¢ gro \$4.50, 10¢
Gold Medal.....7¢ gro \$6.00, 25¢
Mirror.....7¢ gro \$6.00, 1-
Lustro.....7¢ gro \$4.75
Ruby.....7¢ gro \$3.75
Diamond Paste, in 10 lb. trade, 7¢ 12¢
Dixon's Plumbago.....7¢ 8¢
Boynton's Noon Day, 7¢ gro.....13.00
Parlor Pride Stove Enamel, 7¢ gro
Yates Liquid, 2 3 6 10 gal...
7 gal.....\$0.80 70 .60 .50

Yates Standard Paste Polish, 10 lb. cans.

Jet Black.....7¢ gro \$3.50
Japanese.....7¢ gro \$3.50
Firestone.....7¢ gro \$2.50
Diamond O. K. Enamel.....7¢ gro \$19.00
Bonnell's Liquid Stove Polish, 7¢ gro \$9.00
Bonnell's Paste Stove Polish, 7¢ gro \$6.00
Black Bag Benne Paste, 5 and 10 lb.
cans.....13¢4¢
Black Jack Water Paste, 5 and 10 lb.
cans.....12¢4¢
Nicklel Plate Paste.....7¢ gro \$6.00
Crown Paste.....7¢ gross, \$7.20
Green Paste, in 5 and 10 lb. trade, 7¢ 12¢
Black Flag.....7¢ gross, \$7.20
Black Flag, 5 and 10 lb. pails.....7¢ 12¢
Black Flag, liquid, in bottles, 7¢ gro, \$8.50
Diamond Rock Nickel Cleaner, 7¢ gro
\$10.20

Peppers, Corn.

Round or Square, 1 qt., 7¢ gr \$10.00 @ 10.50
Round or Square, 1 1/2 qt., 7¢ gr \$15 @ 15.50
Round or Square, 3 qt., 7¢ gr \$18.50 @ 19.00

Post Hole and Tree Augers

and Diggers—See Diggers, Post
Hole, &c.

Potato Parers—See Parers, Potato.

Pots.

Glue—
Tinned.....40¢10¢40¢10¢5¢
Enamelled.....40¢10¢40¢10¢5¢
Family, Howe's "Eureka".....40¢
Family, L. F. C.'s "Handy".....50¢

Presses.

Enterprise Mfg. Co.....20¢10¢30¢
Hemis.....7¢ dos \$3.50
Shepard's, New City.....40¢
Silver & Co.....7¢ dos \$2.75

Pruning Hooks and Shears.

See Shears.

Purifiers.

Naft.
Scranton.....7¢ dos \$13.00, 33¢4¢
Curtiss Hammer.....7¢ dos \$0.00
Giant, No. 1.....7¢ dos \$15.00, 10¢
Giant, No. 2.....7¢ dos \$15.00, 10¢
Pelican.....7¢ dos \$9.00, 25¢
Eclipse.....7¢ dos \$2.00 net

Pails.

Hot House, Awning, &c.....60¢10¢
Jannaped Screw.....60¢10¢
Brass Screw.....60¢10¢
Jannaped Side.....60¢10¢
Jannaped Clothes Line.....60¢10¢
Empire Sash Pulley.....55¢60¢
Moore's Sash, Anti-Friction.....50¢
Ray Fork, Solid Eye, \$4.00; Swivel,
\$4.50.....50¢10¢50¢10¢5¢
Ray Fork, "Anti-Friction," 5 in. Solid,
\$5.70.....50¢
Ray Fork, 7" Common and Pat.
Bushed.....20¢
Ray Fork, Farbox Pat. Iron.....30¢
Ray Fork, Reed's Self-Lubricating.....45¢
Shade Rack.....45¢
Tackle Blocks.....See Blocks
Moore's Anti-Friction 5 in. Wheel, 7¢ dos
\$18.00.....40¢

Pitchers.

Clifton, Best Makers.....60¢60¢10¢
Pitcher Spout, Best Makers.....67¢70¢
Pitcher Spout, Cheaper G'ds.....75¢75¢10¢

Punches.

Saddlers' or Drive, good, 7¢ dos.....60¢65¢
Bemis & Call Co.'s Cast Steel Drive, 50¢25¢
Bemis & Call Co.'s Springfield Socket, 50¢25¢
Spring, good quality.....7¢ dos \$2.50 @ 2.65
Spring, Leach's Pat.....15¢
Bemis & Call Co.'s Spring and Check.....40¢
Solid Timmers' P. S. & W. Co., 7¢ dos \$1.44, 50¢
Tim's Hotdog Punches P. S. & W. Co. 50¢25¢
Rice Hand Punches.....15¢
Avery's Saw Set.....40¢
Avery's Saw-Set and Punch. See Saw Sets.

Rail.

Sliding Door, Wrt Brass, 7" 35¢.....10¢
Sliding Door, Brn'd Wrt Iron, 7" ft. 7¢
Sliding Door, Iron, Painted, 7" foot 4¢, 40¢
Barn Door, Light In.....\$2.00 2.50 3.75, 10¢
Per 100 feet.....

H. D. for N. E. Hangers—

Small. Med. Large.
Per 100 feet.....\$2.15 2.70 3.25, net
Terry's Steel Rail, 7" foot.....45¢
Victor Track Rail, 7" foot.....50¢25¢
Carrier Steel Rail, 7" foot.....45¢
Moore's Wrought Iron.....25¢

Rakes.

Cast Steel, Association goods.....60¢40¢70¢
Cast Steel, outside goods.....60¢10¢10¢70¢25¢
Malleable.....70¢70¢25¢
Gibbs Lawn Rake.....\$13.00, 50¢15¢
Canton Lawn Rake.....\$9.00, 50¢10¢
Ft. Madison Prize Bow Brace and Peer-
less.....60¢
Fort Madison Steel Tooth Lawn Rake.....\$6.00.....35¢

Razors.

J. R. Torrey Razor Co.....20¢
Westonholme and Butcher, \$10.00 to 2,
10¢
Jordan's AAAI, new list.....net
Jordan's Old Faithful, new list.....net
Galvanic.....7¢ dos \$15.00

Razor Straps—See Straps, Razor.

Rings and Ringers.

Bull Rings—
Union Nut Co.....55¢
Sargent's.....50¢10¢60¢25¢
Hotchkiss' low list.....30¢
Hudson, Beckley & Co.'s.....70¢10¢
Peck, Stow & W. Co.'s, 50¢10¢50¢10¢10¢
Rillich Hdq. Co., White Metal, low list,
50¢20¢10¢

Hog—

Top of the Hill Ringers.....7¢ dos \$2.00
Top of the Hill Rings.....7¢ dos \$1.50
Hill's Improved Ringers.....7¢ dos \$1.50
Hill's Old Style Ringers.....7¢ dos \$1.50
Hill's Tongs.....7¢ dos \$3.00
Hill's Rings.....7¢ dos \$1.00
Perfect Rings.....7¢ dos \$1.50
Perfect Ringers.....7¢ dos \$1.50
Blair's Hog Ringers.....7¢ dos \$2.00
Blair's Hog Rings.....7¢ dos \$1.00
Champion Ringers.....7¢ dos \$2.00
Champion Rings, Double.....7¢ dos \$2.25
Brown's Ringers.....7¢ dos \$2.00
Brown's Rings.....7¢ dos \$1.50 @ 1.25
Electric Hog Rings.....7¢ dos boxes \$1.50
Electric Hog Ringers.....7¢ dos \$2.00

Rivets and Burrs.

Iron, list Nov. 17, '87.....40¢
Copper.....60¢10¢60¢10¢5¢
Coppered Iron, Bettina Brand.....40¢
Rivet Sets—See Sets.

Rods.

Star, Brass.....25¢25¢
Star, Black Walnut.....7¢ dos 40¢

Rollers.

Barn Door, Sargent's list.....60¢10¢10¢
Acme Moore's Anti-Friction.....55¢
Union Barn Door Roller.....70¢

Ropes.

Manila, 1/4 in. and larger.....7¢ 11¢
Manila.....4 in. 7¢ 11¢6¢
Manila, 1/2 and 5-16 in. 7¢ 11¢
Manila Tanned Rope.....7¢ 10¢4¢
Manila Hay Rope.....7¢ 11¢
Sisal.....1/2 inch and larger.....7¢
Sisal.....3/4 in. 7¢ 8¢
Sisal.....1/2 and 5-16 in. 7¢ 8¢
Sisal, Hay Rope.....7¢ 7¢4¢
Sisal, Tanned Rope.....7¢ 7¢4¢
Sisal, Medium Lathe Yarn.....7¢
New Zealand, 1/4 in. and larger.....7¢
New Zealand, 1/2 and 5-16 inch, 7¢ 8¢
New Zealand, Hay Rope.....7¢ 7¢4¢
New Zealand, Tanned Rope.....7¢ 6¢4¢
Note—Manufacturers' prices on above
7¢ lb less, f.o.b. factory
Cotton Rope.....7¢ 13¢ @ 10¢
Jute Rope.....7¢ 6¢ @ 6¢4¢

List May 1, 1886.

Iron.....33¢23¢4¢
Iron, Galvanized.....40¢25¢
Cast Steel.....40¢25¢

Rules.

Boxwood.....80¢10¢10¢80¢10¢10¢10¢
Ivory.....50¢50¢10¢
Starrett's Rules and Straight Edges,
Steel.....25¢10¢

Saw Irons—See Irons, Saw.

Saw and Emery Paper and Cloth—See Paper and Cloth, Saw

Sash Cord—See Cord, Sash.

Sash Locks—See Locks, Sash.

Sash Weights—See Weights, Sash.

Sausage Stuffers or Fillers—

See Stuffers or Fillers, Sausage.

Saws—The following prices are

often cut by jobbers.
Dixton's Circular.....55¢45¢25¢
Dixton's Cross Cuts.....16¢16¢25¢
Dixton's Hand.....20¢20¢5¢
Woodrough & McFarlin.

Hand, Panel and Rip.....25¢25¢25¢
Narrow Champion Cross Cuts with
Handles, 7 foot.....18¢20¢
Champion Thin Back Cross Cuts, 7
foot.....20¢25¢
Champion Extra Thin Back Cross
Cuts, 7 foot.....20¢31¢
One Man Champion Cross Cuts, 7
foot.....37¢40¢

Wheeler, Madden & Clemson Mfg. Co.
Hand, Panel and Rip.....3¢35¢25¢
Narrow Champion Cross Cuts with
Handles, 7 foot.....18¢20¢
Champion Thin Back Cross Cuts, 7
foot.....20¢25¢
Champion Extra Thin Back Cross
Cuts, 7 foot.....20¢31¢
One Man Champion Cross Cuts, 7 ft.,
dis 50¢

Atkins' Circular Shingle and Heading

dis 50¢
Atkins' Silver Steel Diamond X Cuts
7 foot 70¢

Atkins' Special Steel Dexter X Cuts
7 foot 50¢
Atkins' Special Steel Diamond X Cuts
7 foot 35¢

Atkins' Champion and Electric Tooth
X Cuts.....7 foot 30¢
Atkins' Hollow Back X Cuts.....7 foot 30¢
Atkins' Mulay, Mill and Drag.....40¢
Atkins' One-Man Saw, with handles,
7 foot 40¢

Peace Circular and Mill.....45¢45¢55¢
Peace Hand Panel and Rip.....25¢25¢25¢
Peace Cross Cuts.....45¢45¢65¢
Richardson's Circular and Mill.....45¢45¢55¢
Richardson's X Cuts.....45¢45¢55¢
Richardson's Hand, &c.....25¢25¢55¢
C. E. Jennings & Co., Hand
and Rip.....2¢20¢10¢

Hack Saws—		Skins, Thimble—		Stocks and Dies—	
Griffin's, complete.....	40&10&50	Western list.....	75&50&75&10	Waterford Goods.....	40&40&10
Griffin's Hack Saw, Blades.....	40&10&50	Columbus Wrt. Steel. Special net price	50	Butterfield's Goods.....	40&40&10
Star Hack Saws and Blades.....	35	Coldbrookdale Iron Co.....	60	Lightning Screw Plate.....	25&50
Eureka and Crescent.....	35	Seneca Falls Pattern.....	60	Roe's New Screw Plates.....	35&40&50
Scroll—		Utica P. S. T. Skins.....	60	Reversible Ratchet.....	30
Leater, complete, \$10.00.....	25	Utica Turned and Fitted.....	35	Gardner.....	30
Rogers, complete, \$4.00.....	25	Slates—		Stops, Bench.	
Barnes' Builders' and Cab. Makers' \$15.25	35	School, by case.....	50&10&50&10&10	Morrill's.....	40
Barnes' Scroll Saw Blades.....	35	Snaps, Harness, &c.—		Hotchkiss.....	40
Saw Frames—See Frames, Saw.		Anchor (T. & S. Mfg. Co.).....	85	Weston's, No. 1, \$10; No. 2, \$10.25	40
Saw Sets—See Sets, Saw.		Fitch's (Bristol).....	60&10	McGill's.....	40
Saw Tools—See Tools, Saw.		Andrews.....	10	Cincinnati.....	40
Scales—		Sargent's Patent.....	70&10&10	Terrell's Nos. 1 and 2, \$ dos, \$3; No.	3, \$3.50.....
Hatch, Counter, No. 171, good quality.....	100	German, new list.....	40&10	Stone—	
Hatch, Tea, No. 161.....	100	Covert.....	50&10&55	Hindustan No. 1, 3/4; Aze, 3/4; Slips	No. 1, 4 1/4
Union Platform, Plain.....	2.00	Covert, New Patent.....	50&10&55	Washita Stone, Extra.....	25
Union Platform, Striped.....	2.40	Covert, New R. E.....	60&10&55	Washita Stone, No. 1.....	25
Chadillon's Grocers' Trip Scales.....	50	Covered Spring.....	60&10&10	Washita Stone, No. 2.....	25
Chadillon's Eureka.....	25	E. Covert's Triumph.....	40	Washita Slips, No. 1, Extra.....	44&40
Chadillon's Favorite.....	40	Snaths, Scythe.		Washita Slips, No. 1.....	35&35
Family, Turnbulla.....	40	List.....	50	Arkansas Stone, No. 1, 4 to 6 in.....	25
Riehle Bros.' Platform.....	40	Soldering Irons—See Irons, Solder-		Turkey Oil Stone, 4 to 8 in.....	40
Scale Beams—See Beams, Scale		Ing.		Turkey Slips.....	1.00
Scissors, Fluting.....		Spittoons, Cuspidors, &c.—		Lake Superior, Chase.....	1.50
Scrapers—		Standard Fibreware.....		Lake Superior Slips, Chase.....	20
Adjustable Box Scraper (S. R. & L. Co.)	10.00	Cuspidors, 8 1/2-inch, \$ dos., No. 5, \$8;		Seneca Stone, Red Paper Brand.....	20
Box, 1 Handle.....	10	No. 6, \$9.		Seneca Stone, High Rounds.....	25
Box, 2 Handle.....	10	Spittoons, Daisy, 8-inch, No. 1, \$4; 10		Seneca Stone, Small Whets.....	35
Defiance Box and Ship.....	10	and 11 inch, \$6.		Steve Polish—See Polish, Steve.	
Foot, Common.....	10	Spoke Shaves—See Shaves, Spoke.		Stretchers, Carpet.	
Ship, R. I. Tool Co.....	10	Spoke Trimmers—See Trimmers,		Cast Steel, Polished.....	25
Screen Window and Door		Spoke.....		Cast Iron, Steel Points.....	25
Frames—See Frames.		Spoons and Forks—		Socket.....	1.75
Screw Drivers—See Drivers, Screw.		Tinned Iron—		Gullard's.....	1.75
Screws.		Basting, Cen. Stamp. Co's list.....		Strops, Razer—	
Bench and Hand—		Solid Table and Tea, Cen. Stamp. Co's		Genuine Emerson.....	2.00
Bench, Iron.....	55&10&55&10&105	list.....		Imitation "....."	2.00
Bench, Wood, Beech.....	30	Buffalo S. S. & Co.....		Torrey's.....	2.00
Bench, Wood, Hickory.....	30	Silver Plated—(4 mos. or 5% cash 30		Badger's Belt and Com.....	2.00
Hand, Wood.....	25&10&25&10&25	days.)		Lamont Combination.....	4.00
Hand, Grand Rapids, list.....	50	Meriden Brit. Co. Rogers.....		Jordan's Pat. Padded, list Nov. 1, 1889	1.00
Lag, Blunt Point, list Jan. 1, 1890.....	75	C. Rogers & Bros.....		Electric.....	1.00
Coach and Lag, Gimlet Point, list Jan. 1,	1890.....	Rogers & Bro.....		Stuffers or Fillers, Sausage—	
Bed.....	75	Reed & Barton.....		Miles' "Challenge," \$ dos \$20, 50&50&55	
Hand Rail, Sargent's.....	25	Wm. Rogers Mfg. Co.....		Ferry.....	1.00
Hand Rail, H. & P. Mfg. Co.....	70	Robinson, Hall, Miller & Co.....		Draw Cut No. 4, each \$30.00.....	20
Hand Rail, Am. Screw Co.....	75	Rogues & Edwards Silver Co.....		Enterprise Mfg. Co.....	20
Jack Screws, Millers Falls list.....	50	L. Boardman & Son.....		Silver.....	10
Jack Screws, P. S. & W.....	35	Miscellaneous.		Sweepers, Carpet.	
Jack Screws, Sargent.....	50&10&50&10&50	Holmes & Edwards Silver Co.....		Bissell No. 6.....	17.00
Jack Screws, Stearns.....	40&10&105	No. 67 Mexican Silver.....		Bissell No. 7 New Drop Pan.....	12.00
Cork—		No. 30 Silver Metal.....		Bissell, Grand.....	36.00
Humason & Beckley Mfg. Co.....	40&10&50	No. 24 German Silver.....		Grand Rapids.....	24.00
Williams'.....	35	No. 50 Nickel Silver.....		Crown Jewel, No. 1, \$15.00; No. 2,	15.00
Stowe Bros & Hulbert.....	35	No. 49 Nickel Silver.....		Magic.....	17.00
Machine—		Wm. Rogers Mfg. Co.....		Jewel.....	17.00
Flat Head, Iron.....	55	Rogers' Silver Metal.....		Improved Parlor Queen,	
Round Head, Iron.....	50	154 Rogers' German Silver.....		Nickel.....	27.00
Wood—		225 Rogers' Nickel Silver.....		Janned.....	24.00
List January 1, 1891.....	72	German Silver.....		Excelsior.....	22.00
Flat Head Iron.....	67	German Silver, Hall & Elton.....		Garland.....	22.00
Round Head Iron.....	67	Nickel Silver.....		Parlor Queen.....	22.00
Flat Head Brass.....	72	Britannia.....		Housewife's Delight.....	15.00
Round Head Brass.....	65	Boardman's N'ck'l Silver, list July 1,		Queen.....	16.00
Flat Head Bronze.....	73	1891.....		Queen, with band.....	18.00
Round Head Bronze.....	73	Boardman's Britannia Spoons, case		King.....	18.00
Rovers' Drive Screws.....	85	lots.....		Weed, Improved.....	18.00
Scroll Saws—See Saws, Scroll.		Springs—		Hub.....	18.00
Scythes.		Door.—		Hub.....	18.00
Grain.....	40&5&40&105	Torrey's Rod, 39 in.....		Easy.....	18.00
Grass.....	40&10&50	Gray's, \$ gr., \$20.00.....		Monarch.....	18.00
Scythe Snaths—See Snaths, Scythes		Bee Rod \$ gr., \$30.00.....		Goshen.....	21.00
Snaths.		Warner's No. 1, \$ dos, \$2.50; No. 2,		Ladies' Friend.....	15.00
Awl and Tool.		\$3.00.....		Advance.....	15.00
Alken's Sets, Awls and Tools.....	55	Gem (Coll), list April 10, 1886.....		Supreme.....	22.00
No. 20, \$ dos \$10.00.....	55	Star (Coll), list April 10, 1886.....		Tacks, Brads, &c.—	
Pray's Adj. Tool Hds., No. 1, \$12; 2, \$18;	25	Vicor (Coll).....		List October 19, 1889. Old established	
3, \$19; 4, \$20.....	25	Champion (Coll).....		standard weights Short Weight goods	
Miller's Falls Adj. Tool Hds.....	25	Cowell's.....		are sold at lower prices.	
No. 1, \$12; 2, \$18.....	25	Rubber, complete, \$ dos, \$4.50.....		Carpet Tack, Blued.....	75
Henry's Combination Haft.....	25	Hercules.....		American, Tinned and Cop'd.....	75
Stanley's Excelsior.....	25	Carriage, Wagon, &c.—		Steel, Bright and Blued.....	75
No. 1, \$7.50; No. 2, \$4.00; No. 3,	25	Elliptic, Concord, Platform and Hair		Steel, Tinned and Coppered.....	75
\$6.50.....	25	Scroll.....		Swedes Iron, Blued.....	75
Common "rad Sets.....	30	Cliff's Bolster Springs.....		Swedes Iron, Tinned.....	75
No. 42, \$10.50; No. 43, \$12.50.....	70	Squares—		American Iron Tacks.....	75
Nail—		Steel and Iron.....		Swedes Iron Tacks.....	75
Square.....	75	Nickel-Plated.....		S. S. Blued.....	75
Round.....	75	Try Square and T Bevels.....		S. S. Tinned.....	75
Buck Bros.....	27	Disston's Try Square and T Bevels.....		Lanc., Blued.....	75
Cannon's Diamond Point.....	35	Winterbottom's Try and Miter.....		Lanc., Tinned.....	75
Refet.		Starrett's Micrometer Caliper Squares.....		Gimp and Lace Tacks—	
Regular list.....	50&105	Avery's Flush Bevel Squares.....		S. S. Blued.....	75
Saw—		Avery's Bevel Protractor.....		S. S. Tinned.....	75
Stillman's Genuine.....	50	Squeezers.		Lanc., Blued.....	75
Stillman's Pattern Hand, \$ dos \$3.25;	40	Fodder.—		Lanc., Tinned.....	75
Cross Cut, 5.25.....	40	Blair's.....		Gimp and Lace Tacks—	
Common Lever.....	45	Blair's "Climax".....		S. S. Blued.....	75
McMillan's No. 1, \$15.00; Nos. 2&4, \$24.00	40	Lemon—		S. S. Tinned.....	75
Leach's, No. 0, \$3.00; No. 1, \$15; 15&20	80	Porcelain Lined, No. 1.....		Lanc., Blued.....	75
Nash's.....	80	Wood, No. 2.....		Lanc., Tinned.....	75
Hammer, Hotchkiss.....	50	Wood, Common.....		Basket and Trimmers' Tacks—	
Hammer, Bemis & Call Co's new Pat.	30	Dunlap's Improved.....		Lanc.....	85
Bemis & Call Co's Lever and Spring	30	Sammie's No. 1, \$5.00; No. 2, \$4.12		Hungaria's Tacks.....	75
Hammer.....	30	\$18 \$ dos.....		Miners' Tacks, Lanc.....	75
Bemis & Call Co's Plate.....	10	Jennings' Star.....		Common and Patent Brads.....	60
Bemis & Call Co's Cross Cut.....	12	The Boss.....		Leathered Tacks.....	20
Alken's Genuine.....	13	Dean's, Nos. 1, \$ dos, \$6.50; 2, \$3.35; 3,		Brush Tacks.....	20
Alken's Imitation.....	50	\$1.90; Queen, \$2.50		Looking Glass Tacks.....	60
Hart's Pat. Lever.....	30	Lettie Giant.....		Pigtail Frame Points.....	50
Diaston's Star.....	25	Hotchkiss Straight Plank.....		Finishing Nails.....	60
Leopold.....	40	Silver & Co., Glass.....		Trunk and Clout Nails—	
Atkin's Lever.....	40	Manny Lemon Juice Extractor.....		Black.....	60
Atkin's Criterion.....	40	Standard.....		Tinned or Coppered.....	60
Croissant (Keller), No. 1, \$15.00; No. 2,	34	Improved.....		Basket Nails.....	60
Avery's Saw Set and Punch.....	40	Standard Fiber Ware—See Ware,		Chair Nails.....	60
Chieftain Co's Superior.....	40	Standard Fiber.		Cigar Case Frame Points.....	50
Chieftain Co's Royal.....	40	Staples.		Tin Capped Nails.....	50
Crescent.....	40	Blind—		Miscellaneous.	
Sharpeners, Knife.		Barbed, 1/2 in. and larger.....		D'ble-Point, 120 count 55&10&85&10&105	
Parkins.....	40	Barbed, 3/4 in. and larger.....		Wire Carpet Nails.....	50
Applewood Handles.....	40	Fence staples, Galvanized.....		Plymouth Rock Steel Carpet Tacks.....	25
Rosewood or Cocobola.....	40	Fence Staples, Plain.....		Wire Brads and Nails, See Nails, Wire.	
Shaves, Spoke.		See Trd. Rep.		Staples, S. S. & Mfg. Co's	
Iron.....	45	Steelyards.....		list.....	50&10
Wood.....	50	Staples.		Tapes, Measuring—	
Bailey's Stanley B. & L. Co.....	40	Blind—		American.....	40
Stearns.....	30	Barbed, 1/2 in. and larger.....		Spring.....	40
Cincinnati.....	25	Barbed, 3/4 in. and larger.....		Chesterman's, Regular list.....	25
Goodell's, \$ dos \$9.00.....	25	Fence staples, Galvanized.....		Thermometers—	
Shears—		Fence Staples, Plain.....		Rin Case.....	80
American (Cast) Iron.....	75	See Trd. Rep.		Thimble Skins—See Skins.	
Barnard's Lamp Trimmers.....	30	Staples.		Ties, Bale—St	
Tinner's.....	30	Blind—		Standard Wire, list.....	50
Seymour's, List, Dec. 1891.....	60	Barbed, 1/2 in. and larger.....		Timners' Shears, &c.—See Shears	
Heinrich's, List, Dec. 1891.....	60	Barbed, 3/4 in. and larger.....		Timners'.....	
Heinrich's Tailor's Shears.....	35	Fence staples, Galvanized.....		Tinned's.....	
Cast Steel Trimmers.....	80	Fence Staples, Plain.....		Tinned's.....	
First quality.....	80	See Trd. Rep.		Tinned's.....	
Second quality.....	80	Steelyards.....		Tinned's.....	
Acme Cast Shears.....	10	Staples.		Tinned's.....	
Diamond Cast Shears.....	10	Blind—		Tinned's.....	
Clipper.....	10	Barbed, 1/2 in. and larger.....		Tinned's.....	
Victor Cast Shears.....	75	Barbed, 3/4 in. and larger.....		Tinned's.....	
Howe Bros. & Hulbert, Solid Forged	40	Fence staples, Galvanized.....		Tinned's.....	
Steel.....	40	Fence Staples, Plain.....		Tinned's.....	
Chicago Drop Forge & F. Co. Solid	60	See Trd. Rep.		Tinned's.....	
Steel Forged.....	60	Steelyards.....		Tinned's.....	
Davenport Cutlery Co.....	60	Staples.		Tinned's.....	
Clausen Shear Co., Japanese.....	70	Blind—		Tinned's.....	
Clausen Shear Co., Nickle, same list.....	60	Barbed, 1/2 in. and larger.....		Tinned's.....	
Galvanic, 3/4 to 1 in, \$ dos, \$1.00 1/2 inch	40	Barbed, 3/4 in. and larger.....		Tinned's.....	
Pruning Shears and Hooks.		Fence staples, Galvanized.....		Tinned's.....	
Diaston's Combined Pruning Hook and	10	Fence Staples, Plain.....		Tinned's.....	
Saw.....	10	See Trd. Rep.		Tinned's.....	
Diaston's Pruning Hook.....	10	Steelyards.....		Tinned's.....	
E. S. Lee & Co's Pruning Tools.....	40	Staples.		Tinned's.....	
Pruning Shears, Henry's Pat., \$ dos	40	Blind—		Tinned's.....	
Henry's Pruning Shears.....	40	Barbed, 1/2 in. and larger.....		Tinned's.....	
Wheeler, M. & C. Co's Combination.....	20	Barbed, 3/4 in. and larger.....		Tinned's.....	
Dunlap's Saw and Chisel.....	50	Fence staples, Galvanized.....		Tinned's.....	
J. Mallinson & Co., No. 1, \$5.25; No. 2, 7.25	60	Fence Staples, Plain.....		Tinned's.....	
P. S. & W. Co.....	60	See Trd. Rep.		Tinned's.....	
Tanners', &c.		Steelyards.....		Tinned's.....	
Shears and Snips (P. S. & W.).....	30	Staples.		Tinned's.....	
Snips, J. Mallinson & Co.....	35	Blind—		Tinned's.....	
Shaves—		Barbed, 1/2 in. and larger.....		Tinned's.....	
Sliding Door—		Barbed, 3/4 in. and larger.....		Tinned's.....	
M. W. Co., list July, 1888.....	50	Fence staples, Galvanized.....		Tinned's.....	
R. & E., list Dec. 18, 1885.....	55	Fence Staples, Plain.....		Tinned's.....	
Corbin's list.....	60	See Trd. Rep.		Tinned's.....	
Patent Roller.....	60	Steelyards.....		Tinned's.....	
Patent Roller, Hatfield's.....	75	Staples.		Tinned's.....	
Russell's Anti-Friction, list Dec. 18,	1885.....	Blind—		Tinned's.....	
Moore's Anti-Friction.....	60	Barbed, 1/2 in. and larger.....		Tinned's.....	
Sliding Shutter—		Barbed, 3/4 in. and larger.....		Tinned's.....	
R. & E. list Dec. 18, 1885.....	60	Fence staples, Galvanized.....		Tinned's.....	
Sargent's list.....	60	Fence Staples, Plain.....		Tinned's.....	
Reading list.....	60	See Trd. Rep.		Tinned's.....	
Shells—		Steelyards.....		Tinned's.....	
First quality 4, 8, 10 and 12 gauge.....	80	Staples.		Tinned's.....	
First quality, 14, 16 and 20 gauge (\$10	10)	Blind—		Tinned's.....	
Price.....	40	Barbed, 1/2 in. and larger.....		Tinned's.....	
Star, Club, Rival and Climax brands.....	30	Barbed, 3/4 in. and larger.....		Tinned's.....	
Setbold's Comb. Shot Shells.....					

Tinware—

Stamped, Japanned and Plead, list
Jan. 30 1887.....70&10@70&25

Tire Benders, Upsetters, &c—

See Benders and Upsetters, Tire.

Tools.**Coopers—**

Bradley's.....304
Barton's.....304
L. & J. White.....304
Albertson Mfg. Co.....254
Beatty's.....254
Sandsky Tool Co.....254
Shaves, Cincinnati Tool Co.....254

Lumber.

Ring Peavies, "Blue Line".....\$ dos \$20.00
Ring Peavies, Common.....\$ dos \$18.00
Steel Socket Peavies.....\$ dos \$21.00
Mail Iron Socket Peavies.....\$ dos \$19.00
Cant Hooks, "Blue Line".....\$ dos \$16.00
Cant Hooks, Common Finish.....\$ dos \$14.00
Cant Hooks, Mail Socket Clasp, "Blue Line" Finish.....\$ dos \$14.00
Cant Hooks, Mail Socket Clasp, Common Finish.....\$ dos \$14.50
Cant Hooks, Clip Clasp, "Blue Line" Finish.....\$ dos \$14.00
Cant Hooks, Clip Clasp, Common Finish.....\$ dos \$12.00
Hand Spikes.....\$ dos 6 ft., \$15.00; 8 ft., \$20.00
Pike Poles, Pike & Hook.....\$ dos, 12 ft., \$11.50; 14 ft., \$12.50; 16 ft., \$14.50; 18 ft., \$17.50; 20 ft., \$21.50
Pike Poles, Pike only.....\$ dos, 12 ft., \$10.00; 14 ft., \$11.00; 16 ft., \$12.00; 18 ft., \$13.00; 20 ft., \$15.00
Pike Poles, not ironed.....\$ dos, 12 ft., \$6.00; 14 ft., \$6.50; 16 ft., \$7.00; 18 ft., \$7.50; 20 ft., \$8.00
Setting Poles.....\$ dos, 12 ft., \$14.00; 14 ft., \$15.00; 16 ft., \$17.00
Swamp Hooks.....\$ dos \$18.00

Saws.

Atkins' Perfection.....\$ dos \$12.00
Atkins' Excelsior.....\$ dos \$6.00
Atkins' Giant.....\$ dos \$4.00

Tobacco Cutters—See Cutters, Tobacco.**Transom Lifters—See Lifters, Transom.****Traps—****Game—**

Newhouse.....40@40&25
Onida Pattern.....70@105
Game, Blake's Patent.....40@10&25
Mouse and Rat—
Mouse Wood Choker.....\$ dos holes, 11@12
Mouse, Round Wire.....\$ dos \$1.50 105
Mouse, Cage, Wire.....\$ dos \$2.50 105
Mouse, Catch-em-alive.....\$ dos \$2.50 154
Mouse, Bonanza.....\$ dos \$0.90@1.00
Rat, Decoy.....\$ gr \$10.00 105
Ideal.....\$ gr \$10.00 105
Cyclone.....\$ gr \$6.25
Hotchkiss Metallic Mouse, 5-hole traps.....\$ dos, 204, in full cases, \$ dos.....754
Hotchkiss Imp. Rat Killer.....\$ gr \$16.50
Hotchkiss New Rat Killer.....\$ gr \$16.50
Schuyler's Rat Killer.....\$ gr \$16.00

Trimmers—

Butter and cheese.....354
Trimmers, Spoke.

Bonney's.....\$ dos \$10.00 504
Stearns.....30&105
Ives', No. 1, \$15.00; No. 2, \$12.00.....55&105
Douglas.....\$ dos \$0.20 204
Cincinnati.....\$ dos \$0.20 204

Triers—

Butter and cheese.....354

Trimmers, Spoke.

Bonney's.....\$ dos \$10.00 504
Stearns.....30&105
Ives', No. 1, \$15.00; No. 2, \$12.00.....55&105
Douglas.....\$ dos \$0.20 204
Cincinnati.....\$ dos \$0.20 204

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Saw Filers—

Bonney's, Nos. 2 & 3, \$15.00.....40&105
Stearns.....33&10@33&10&105
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Sargent's.....69&4105
Hopkins.....\$ dos \$17.50 105
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Combination Hand Vises.....\$ gr \$42.00
Cowell Hand Vises.....304
Bauer's Pipe Vises.....104
Cincinnati.....254 105
Enterprise Pipe Vises, each.....\$3.00
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Wade—Price per M.

J.M.C.W.R.A.—B.E., 11 up.....684
J.M.C.W.R.A.—B.E., 9&10.....824
J.M.C.W.R.A.—B.E., 8.....964
J.M.C.W.R.A.—B.E., 7.....110
J.M.C.W.R.A.—P.E., 11 up.....115
J.M.C.W.R.A.—P.E., 9&10.....150
J.M.C.W.R.A.—P.E., 8.....170
J.M.C.W.R.A.—P.E., 7.....180
Sley's B.E., 11 up.....\$1.70@1.75
Sley's P.E., 11@30.....3.00@3.25

Wagon Boxes—See Boxes, Wagon.**Washer Cutters—See Cutters, Washer.****Wagon Jacks—See Jacks, Wagon.****Ware, Hollow, Enameled, &c.**

Cast Iron, Hollow—
Stove Hollow-Ware—
Ground.....60&105
Unground.....60&10&105
White Enameled Ware—
Mashin Kettles.....70&10@70&10&25
Boilers and Saucepans.....60&10&25
Tinned Boilers and Saucepans.....60&10&25
Rustless Hollow-Ware.....50&50&25
Gray Enameled Ware—
Stove.....504
Mashin Kettles.....60&10&105
Boilers and Saucepans.....40&25

Enameled—

Agate and Granite Ware, list Jan. 1, 1889.....53&4105

Ironclad Enameled Ware.....dis 33&4105**Kettles—**

Galvanized Tin-Kettles—
Inch.....6 8 9
Each.....554 604 754

Standard Fiber—

Per Dozen.
Plain, Dec'r'd.....\$2.00 \$2.25
Wash-Basins, 10 1/4 in.....2.25 2.75
Wash-Basins, 12 in.....2.25 2.75
Keelers, 1 1/4 in.....4.00
Cupboards.....8.00
Spittoons, "Daisy," 8 in.....4.00
Peck Measure.....4.00
Half-Peck Measure.....3.50
See also Falls.

Indurated Fiber—254

Spittoons, No. 2, \$ dos.....\$8.40
Basins, Rings, &c., No. 2.....\$3.00
Washbubs, Nested, Nos. 0, 1, 2 and 3 (4 pieces), \$ nest.....\$7.50
Keelers Nested, Nos. 1, 2, 3 and 4 (4 pieces), \$ nest.....\$2.90
Butter Bowls 15, 17 and 19-inch (3 pieces), \$ nest.....\$1.70
Liquid Measures, pt., qt., 3 qt. and funnel (4 pieces), \$ set.....\$1.60
See also Falls.

Silver Plated, Hollow—

4 mo. or 5 c cash in 30 days.
Reed & Barton.....
Meridies Britannia Co.....40&25
Simpson, Hall, Miller & Co.....40&25
Rogers & Brother.....
Hartford Silver Plate Co.....40&25
William Rogers Mfg. Co.....40&25

Washers—

Size hole.....5-16 1/4 1/2 3/4 to 1 1/2
Washers.....6 8 10 12
In lots less than 200, \$ 1/2, add 1/4, 5-8 boxes 1¢ to list.

Wedges—

Iron.....\$ 2 5/4
Steel.....\$ 2 3/4

Weights, Sash—

Solid Eyes.....\$ ton \$13&15

Well Buckets, Galvanized—\$10

Buckets, Well, Galvanized.

Wheels, Well.

8 in., \$2.25; 10 in., \$2.70; 12 in., \$3.31

Wire and Wire Goods—

Iron—

Br. & Ann., Nos. 0 to 18.....774
Cop'd, Nos. 0 to 18.....754

Galv., Nos. 0 to 18.....6745

Tin'd, Tinned list Nos. 0 to 18.....6745

Br. and Ann'd, Nos. 16 to 18.....7745

Bright and Ann'd, Nos. 19 to 26.....904

Br. and Ann'd, Nos. 27 to 36.....824

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Steel Music Wire, 12 to 30.....604

Wire Clothes Lines, see Lines.

Wire Picture Cord see cord.

Bright Wire Goods—

Standard list.....80&105

Wire Cloth and Netting.

Painted Screen Cloth, good quality.....\$ 100 sq. ft., \$1.40

Galvanized Wire Netting.....70&10&25

Wire, Barb.—F.o.b. Cars. Dis. 34

cash in 10 days.

Painted, Ised.

Pittsburgh and Cleveland, \$2.55.....\$3.05

Allentown, Cincinnati and.....2.65 3.15

Joliet.....2.70 3.20

St. Louis.....2.75 3.25

Lockport, Baker's Perfect.....2.35 3.35

Lawrence and Omaha.....2.90 3.40

San Francisco.....3.80 4.30

Wire Rope—See Rope, Wire.**Wrenches—**

American Adjustable.....404

Baxter's Adjustable "S".....40&10&504

Baxter's Diagonal.....40&10&504

Coe's Genuine.....50&254

Coe's "Mechanics".....50&10&254

Girard Standard.....50&105

Lamson & Sessions' Engineers'.....60&105

Lamson & Sessions' Standard.....70&105

P. S. & W. Agricultural.....75&105

Girard Agricultural.....70&10&254

Lamson & Sessions' Agric'l.....70&10&254

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No. 3 Pipe.....40&105

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The Favorite Pocket.....\$ dos \$4.00 494

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Always Ready.....35&254

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Taft's Vice Wrench.....55&10&254

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Staples, Hooks, &c., list Jan. 13, 1886, 85@85&154

PAINTS, OILS AND COLORS.—Wholesale Prices.**Animal and Vegetable Oils.**

Linseed, City, raw, per gal. 37 @ ..
Linseed, City, refined.....38 @ 40
Linseed, Western, raw.....35 @ 36
Lard, City, Extra Winter.....56 @ 58
Lard, City, Prime.....54 @ 56
Lard, City, Extra No. 1.....424 @ 45
Lard, City, No. 1.....374 @ 40
Lard, Western, prime.....53 @ 54
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Cotton-seed, Summer Yellow, prime.....30 @ 31
Cotton-seed, Summer Yellow, off grades.....28 @ 29
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Menhaden, Crude, Southern.....37 @ 38
Menhaden, Light Pressed.....37 @ 38
Menhaden, Bleached W'ter.....38 @ 39
Menhaden, Extra Bleached.....40 @ 41
Tallow, City, prime.....424 @ 45
Tallow, Western, prime.....424 @ 45
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Cocoanut, Cochiti.....64 @ 65
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Strait.....36 @ 37
Olive, Italian, bbis.....61 @ 62
Neatfoot, prime.....55 @ 56
Palm, prime, Lagos.....6 @ 64

Mineral Oils.

Black, 20 gravity, 25 @ 30 cold test.....per gal 7 @ 74
Black, 20 gravity, 15 cold test.....8 @ 84
Black, 20 gravity, summer.....8 @ 84
Cylinder light, altered.....15 @ 16

Cylinder, dark, filtered.....12 @ 15

Paraffine, 23 1/2 @ 24 gravity.....134 @ 14

Paraffine, 25 gravity.....124 @ 13

Paraffine, 28 gravity.....8 @ 84

Paraffine, red, 23 1/2 @ 24 grty 13 @ 14

Paints and Colors.

Barytes, Foreign, \$ ton \$25.00.....@24.00

Barytes, Amer. floated.....@30.00

Barytes, Amer. No. 1.....@20.00

Barytes, Amer. No. 2.....@16.00

Barytes, Amer. No. 3.....@12.00

Blue, Celestial.....\$ 6 @ 8

Blue, Chinese.....50 @ 55

Blue, Prussian.....25 @ 40

Blue, Ultramarine.....8 @ 25

Brown, Spanish.....14 @ 1

Brown, Vandyke, Amer.....3 @ 34

Brown, Vandyke, English.....6 @ 8

Carmine, No. 40, in bulk.....3.10

Carmine, No. 40, in boxes or barrels.....3.20

Carmine, No. 40, in ounce bottles.....4.20

Chalk, in bulk.....\$ ton 1.75

Chalk, in bbis.....\$ 100 8 33 @ 40

China Clay, English.....\$ ton 12.00

Cobalt Oxide, prep'd.....2.90

Cobalt Oxide, black.....lots 100 2.30 @

Cobalt Oxide, black.....less 100 2.65 @

Green, Paris, 170 @ 175.....14 @ 154

Green, Paris, 170 @ 175.....144 @ 154

Green, Chrome, ordinary.....8 @ 11

Green, Chrome, pure.....22 @ 25

Lead, Eng., B.B. white.....84 @ 10

Lead, Ann. White, dry or in oil.....\$ 74

Kegs, lots less than 500.....@ 7

Kegs, lots 500 to 5 tons.....@ 7

Kegs, lots 5 tons to 12 tons.....@ 74

Kegs, lots 12 tons and over.....@ 74

Lead White in oil 25 @ tin pails add to keg price.....@ 4

Lead White, in oil, 12 1/2 @ tin pails add to keg price

THE IRON AGE

A Review of the Hardware, Iron and Metal

Published every Thursday Morning by David Williams, Nos. 96, 98, 100 & 102 Reade Street, New York

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MANUFACTURERS OF
OUR BELTING IS TANKED ON THE INTERIOR IS RAWHIDE THE ONLY PERFECT BELT MADE NO SLIPPING OR LOSS OF MOTION
ALSO RAWHIDE LACE LEATHER
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Respectfully

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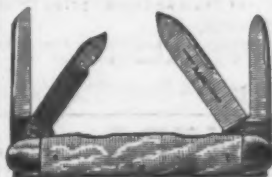
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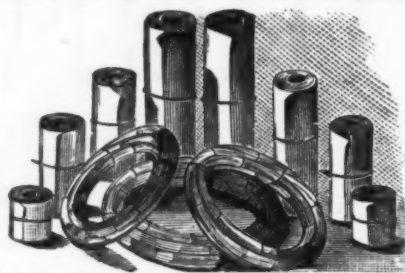
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Trimmings, &c.*

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THE

IRON

PRICE

A Review of the Hardware, Iron and Metal Trades.

Published every Thursday Morning by David Williams, Nos. 96, 98, 100 & 102 Reade St., New York

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Green Paper, Waterproof, Strong Primer.

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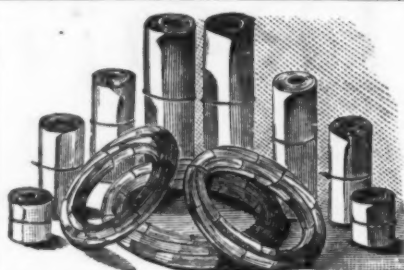
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A Review of the Hardware, Iron and Metal Trades.

Published every Thursday Morning by David Williams, Nos. 96, 98, 100 & 102 Reade St., New York

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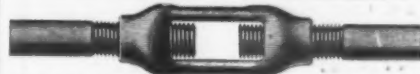
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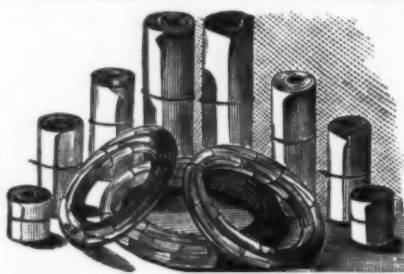
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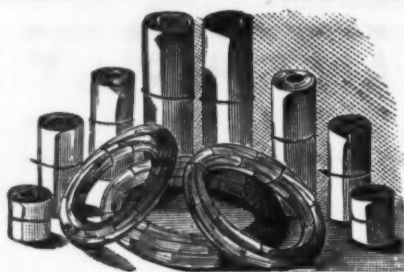
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THE IRON AGE

A Review of the Hardware, Iron and Metal

Published every Thursday Morning by David Williams, Nos. 96, 98, 100 & 102 Reade St., New York

Vol. XLVIII: No. 6.

New York, Thursday, August 6, 1891.

\$4.50 a Year, including Postage.
Single Copies, Ten Cents.

Reading Matter Contents.....page 237
Classified List of Advertisers.... " 130
Alphabetical Index to Advertisers " 134
Advertising and Subscription Rates " 135



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Is absolutely the only Triple Action Freezer known.
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CANNOT COLLAPSE. WILL NOT LEAK.

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Every valve tested and warranted, all parts interchangeable
Nothing but best Steam Metal used in the manufacture.
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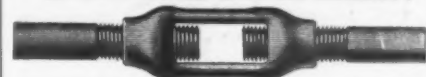
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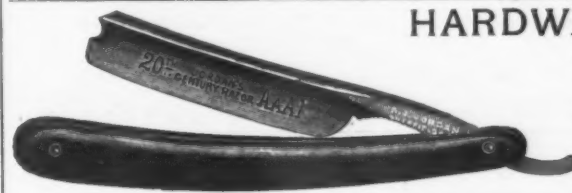


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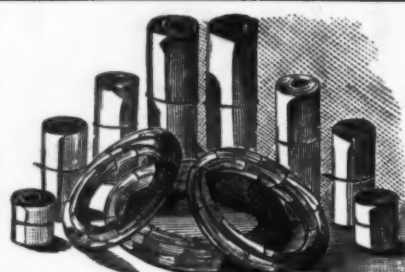
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Smithsonian Institution
Washington D.C.
1892

A Review of the Hardware, Iron and Metal Trades.

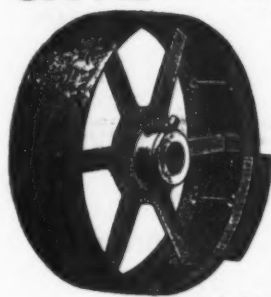
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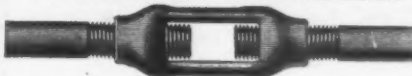
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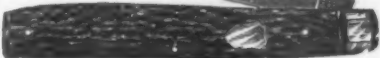
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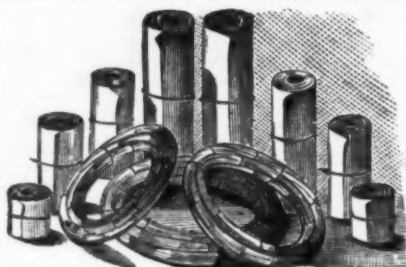
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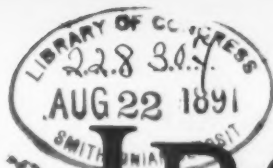
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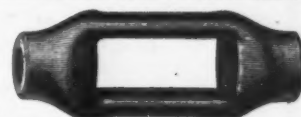
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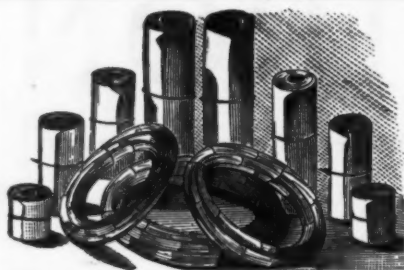
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Vol. XLVIII: No. 9.

New York, Thursday, August 27, 1891.

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Classified List of Advertisers.... " 102
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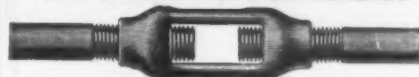
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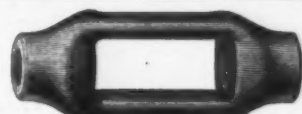
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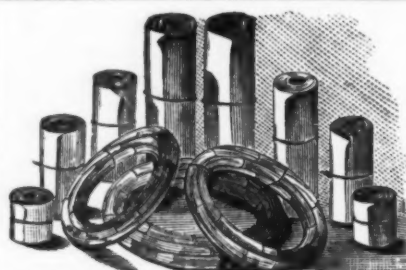
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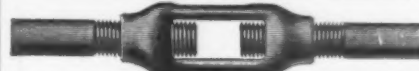
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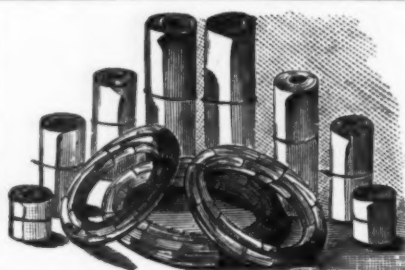
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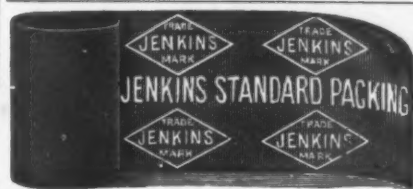
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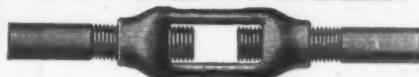
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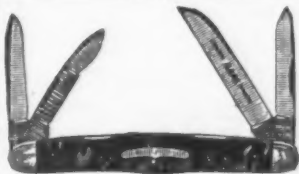


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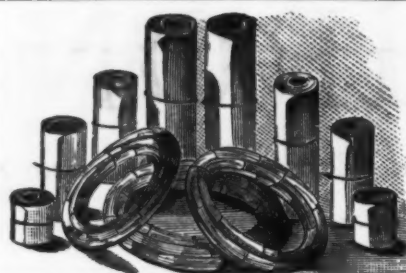
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Vol. XLVIII: No. 12. New York, Thursday, September 17, 1891.

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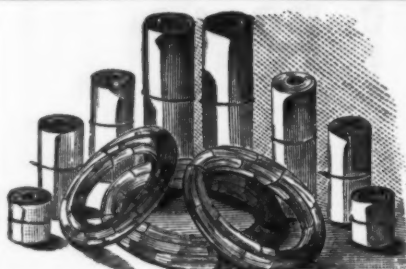
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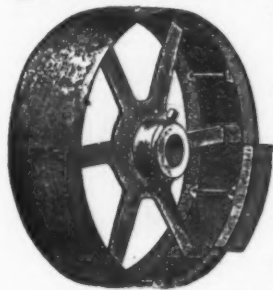
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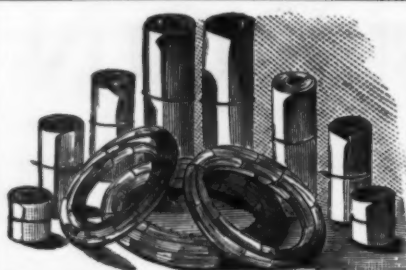
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THE IRON AGE

A Review of the Hardware, Iron and Metal Trades.

Published every Thursday Morning by David Williams, 02 Reade St., New York

Vol. XLVIII: No. 14.

New York, Thursday, October 1, 1891.

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Single Copies, Ten Cents.

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Ask your dealer for the New U. M. C. high grade "Trap" Shells.

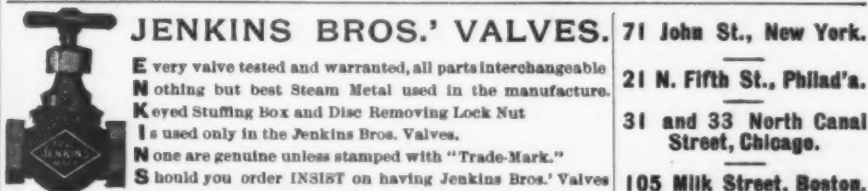
Green Paper, Waterproof, Strong Primer.

The Union Metallic Cartridge Co.,
BRIDGEPORT, CONN.

RANDOLPH & CLOWES
WATERBURY, CONN.,
—SOLE MANUFACTURERS OF—

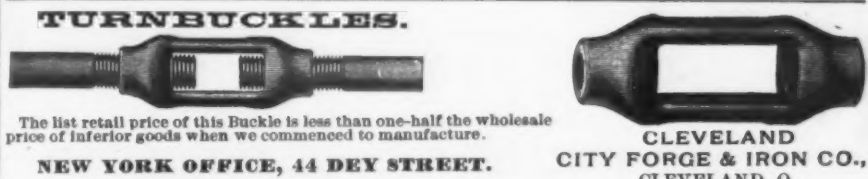
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CANNOT COLLAPSE. WILL NOT LEAK.

Ordinary weight boiler tested to 200 lbs., extra heavy to 300 lbs. pressure per square inch; but not recommended for a service of more than half the test. Send for circular on this subject. Made of two seamless drawn copper shells. Handsomest, best and strongest in the market. Send for circular giving instructions for prevention of accidents. Also proprietors of the Brown & Bros. Tubing and Boiler Works and the Brown & Bros. Brass and Copper Rolling Mills.



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Nothing but best Steam Metal used in the manufacture.
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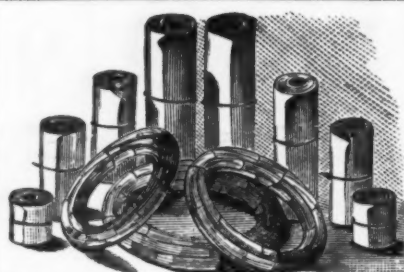
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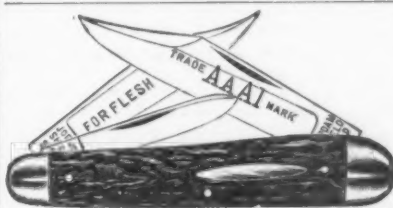


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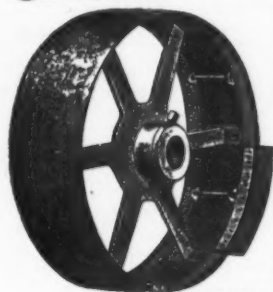
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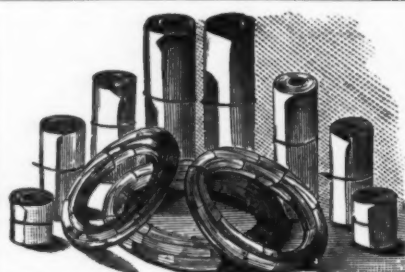
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Smithsonian Institution
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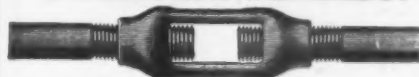
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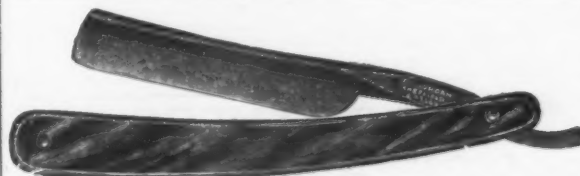


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Washington Institution
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Published every Thursday Morning by David Williams, Nos. 96, 98, 100 & 102 Reade St., New York

Vol. XLVIII: No. 17. New York, Thursday, October 22, 1891.

\$4.50 a Year, including Postage.
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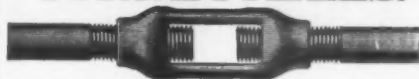
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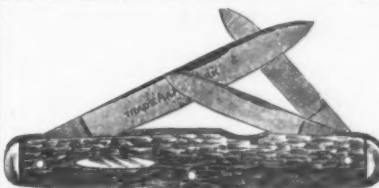
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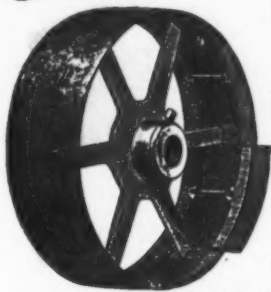
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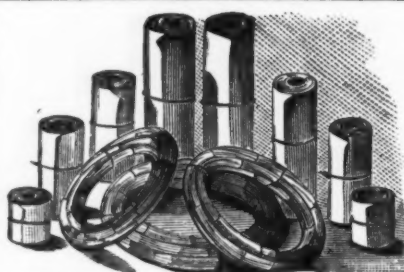
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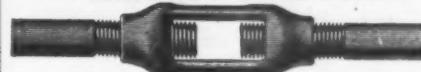
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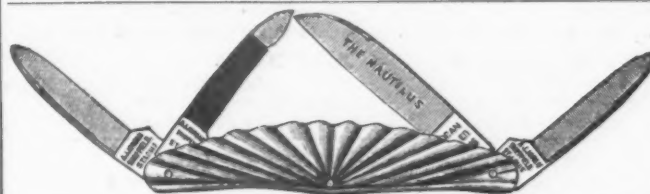


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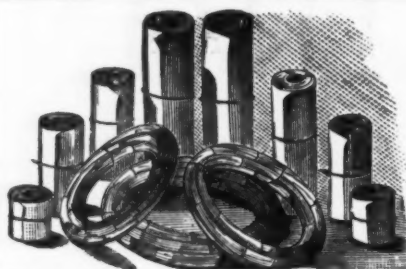
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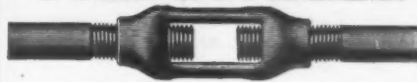
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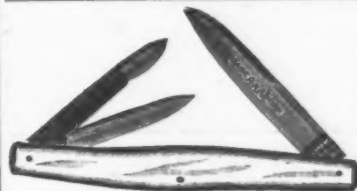


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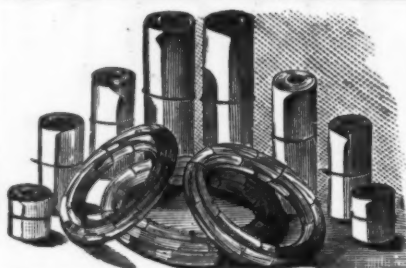
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NOV 13 1891

THE IRON AGE

A Review of the Hardware, Iron and Steel Trades.

Published every Thursday Morning by David Williams, Nos. 96, 98, 100 & 102 Reade St., New York

Vol. XLVIII: No. 20. New York, Thursday, November 12, 1891.

\$4.50 a Year, including Postage.
Single Copies, Ten Cents.

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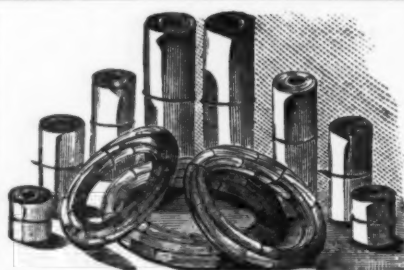
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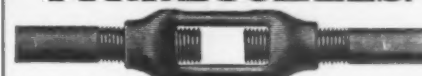
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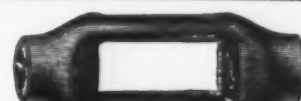
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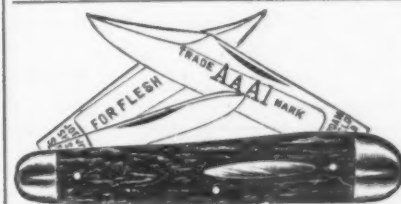


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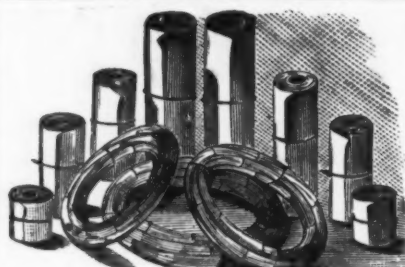
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Vol. XLVIII: No. 22. New York, Thursday, November 26, 1891.

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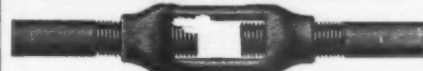
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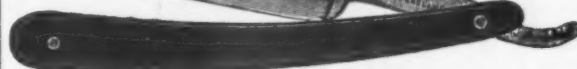
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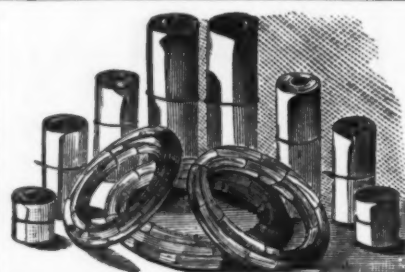
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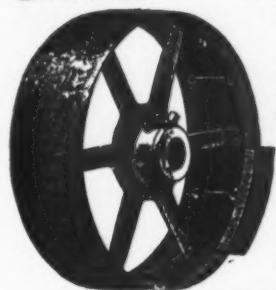
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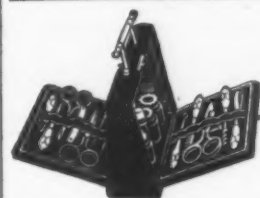


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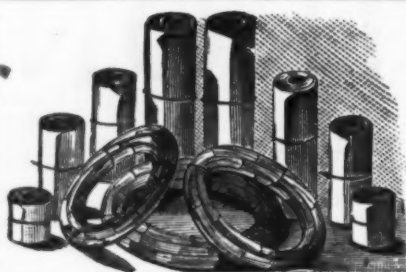
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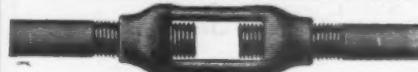
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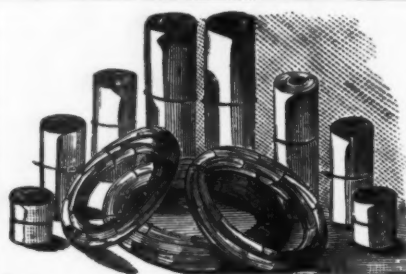
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Vol. XLVIII: No. 25. New York, Thursday, December 17, 1891.

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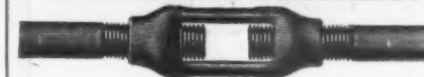


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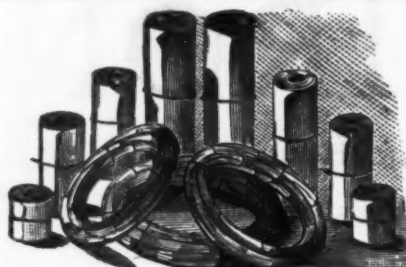
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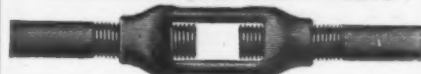
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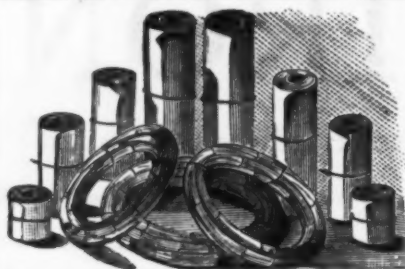
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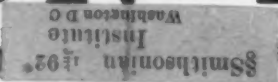
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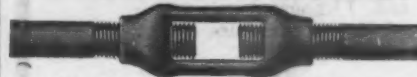


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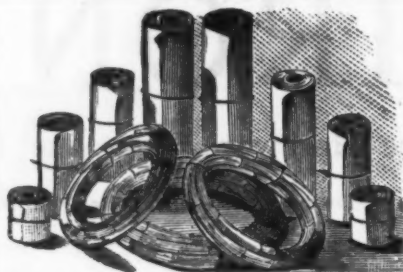
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